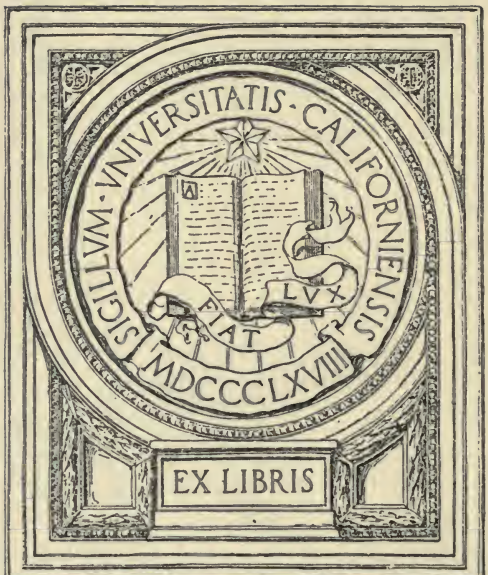

TECHNICAL EXPOSITION

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A Textbook on the Application of Exposition to Technical Writing, Designed for Students in Scientific, Agricultural, and Engineering Colleges

by

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PREFACE

THE study of English at a scientific school has a more directly professional application than it has at an academic college. Instead of courses in literature with their cultural purposes, courses are given that prepare the students for the types of reading and writing that will be required of them after they are graduated from college. Most of the students have definitely chosen their life work and have the right to expect their college courses to be shaped toward equipping them for that work. English, however, is more than a tool, it is a part of life itself in all its many activities. The task of the Department of English is to train the students to use the language effectively as a tool and also to lead them by means of that instruction into the larger field of literary appreciation and culture.

This textbook is prepared to cover the more practical aspects of the instruction in English which follow the ground work in composition and rhetoric and is designed for a single semester's course. It has grown out of the courses at Case

School of Applied Science in the last ten years. During that time no textbook has been found entirely satisfactory for the whole semester, although several different ones have been used for a few weeks at a time. The most effective work has been done by using current periodicals and giving class instruction from the desk. A variety of magazines have been used, sometimes one for the entire semester, and sometimes three or four different ones for a week or more each. It is well to have some periodical available from the very beginning of the semester's work. The textbook is intended to be used with the periodical, and therefore gives little material for use; it gives the theory and leaves the practical forms to be found fresh for every class. Upon the basis of three hours of class work a week, as at Case, the textbook can be used one hour and the magazine the other two. Dictionary practice, original investigation, and theme writing furnish many possibilities.

I wish to make acknowledgments to my predecessor, Dr. J. Martin Telleen, who first shaped up the course at Case, and to my colleagues, Arthur Mochel and George H. Bost, who have made many helpful suggestions both as to the content of the course and the method of presentation.

K. O. Thompson.

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CHAPTER I

THE EXPOSITORY METHOD

The Types of Writing. All writing is divided into four types. The boundaries between them are not so sharply drawn as were those of the traditional three parts of Gaul, but they are sufficiently clear to separate the kinds of written composition for the purposes of analysis. Every piece of writing can be classified under some one of these four types, although detached sentences and bits of humor are not always readily placed. To the four types are given the names: narration, description, argumentation, and exposition. In this book we shall be concerned with only the last-named; but in order to gain a background for our study that will help us understand the various applications of exposition, we shall first review the distinctive characteristics and purposes of all four types of writing.

Narration. Narration is the type of writing that

relates in a definite order a happening or a series of happenings. The happenings may be real or may be fictitious; the most important characteristic of narration is the presence of an orderly development—a thread of connection running through the material. A chronological order is the most common, but may be varied by a climactic order for purposes of emphasis, and in some recent books of history has been reversed in order to bring out the influence of causes. In any case, the plan of procedure adapted to the subject matter or to the purpose of the author is the main element. Examples of narration in literature include: the novel, the short story, the ballad, the epic poem, drama, biography, and history. The handling of narrative material offers a varied field for the personality of the writer to enter in direct ways—*e. g.*, the partisan opinion of a historian, the prejudice of a biographer, the imagination of a poet or dramatist. Effective narration, however, is true to the spirit of the setting in any account, historical or fictitious. From one point of view this type is the most elemental of the four, for it implies the attempt to tell another person what has taken place. The subject matter is a particular event, or period, or person; narration is not concerned with things in general, but deals with something that is quite definite in the mind of the writer. It requires ability first to select the items that will sustain

the interest of the readers, and then to organize that material skillfully. The art of narration is that of the teller of stories of human experience—an art that has been rightly considered one of the most effective abilities of mankind.

Description. Description is the type of writing that portrays by means of language any natural or imagined object. To some extent description is involved in narration, for a writer must be able to visualize the scene or the persons involved in an event, in order to set forth the action that takes place. Action has a background; description presents that background. The personal element is somewhat more subordinated than it is in narration, in order to increase the appeal that lies in the object itself. Accuracy of observation, careful selection of details, and acquaintance with the subtleties of a varied vocabulary are essentials for a writer of description. From one point of view this type is the most elemental of the four, for it implies the attempt to tell another person what one sees. Whether primitive man first wanted to tell what he saw or what he experienced is a disputed point, since the two are closely related. The outstanding examples of description are: lyric poetry, books of travel, nature-study essays, and informative treatises. These require, not organizing ability so much as sensitiveness to details and an emotional reaction. The writer of description must make

others see with considerable vividness what he himself has seen with his physical eyes or in his fancy.

Argumentation. Argumentation is the type of writing that marshals evidence toward securing an acceptance of a particular opinion. The decision sought will in most cases involve some action as well as intellectual assent. The contention may be limited to one side of a question, but generally it attempts to refute opposing ideas as well as to support one chosen side. Keen discrimination of thought and some forcefulness in presenting ideas are required in him who would write argumentation. His mind must work logically. The skill of a general, who not only must enlist his army units, but must place each one to the greatest advantage with his other units, must be applied to the gathering and the presentation of facts in argumentation. The writer of argumentation must range the whole field of knowledge for material and must bring his findings to bear with telling effect upon the opinions of those whom he opposes and would win over to his side. An emotional or persuasive element is often present, but the primary appeal is to the intellect. As one student put it: "Argumentation excites our sense of logic"—a faculty, however, that is not easily excited in many people. The ability to think is required by the writer and by the reader of this type, no less by the one than by

the other. The great examples in literature are: forensics, orations, and speeches in behalf of some cause.

Exposition. Exposition is the type of writing that explains a process or an object in order to bring out underlying principles. It concerns itself with an accurate and clear presentation of principles as contrasted with appearances. It is, therefore, general rather than particular, broad rather than specific. The subject may be a single machine, a definite process, or just one idea, but the author brings out the aspects that are typical of all similar machines, processes, or ideas. He discusses laws and principles. In doing this he must include a description of the appearance of the parts, and must, therefore, have the power of observation that was stated as essential in the writer of description; but he is describing for the sake of explaining, rather than for the mental picture of the object itself that he is handling. The discussion of principles often involves the preference of one explanation over against another; the writer of exposition must have, therefore, the skill in presentation of evidence that was stated as necessary to the writer of argumentation. The exposition of a process may require the relation of a series of happenings; the writer of exposition, therefore, must have the ability to organize material, that was associated with the writer of narration. Exposition, then, overlaps the three

other types of writing; it frequently uses the other types in order to bring out with the highest effectiveness the explanation that it seeks to make. This type is frequently put before the others for study because of the many occasions in daily life for explaining something. The questions of the child, the natural curiosity of the growing mind, the constantly occurring problems of life—all give it first place psychologically, if not chronologically. The best examples in literature are: essays, treatises, textbooks (except histories and anthologies), guidebooks, critical discussions, and handbooks.

The Importance of Exposition. The importance of any one of the four types of writing is entirely a relative matter; it depends upon the purpose to be served. The circumstances of life require them all and early brought them all into existence. They have developed together in varying degrees of effectiveness and seldom in wholly pure forms. The dependence of exposition upon the other types, as set forth in the preceding paragraph, is an indication of what might be said in a discussion of any one of the other types concerning its composite tendencies. The best writings of literature show combinations of types of writing and yet may be classed as one or another according to prevailing purposes or predominant characteristics. Some textbooks use compound names to supplement the list of the four main types—*e. g.*, expository-

narration, descriptive-narration, etc.; but if we recognize that the types are distinguished primarily for the purposes of analysis, we need not resort to such an expedient. Rather we will ask about the chief purpose to be accomplished, and which of the four types of writing will fit the best.

If our answer is exposition, then we want to go farther and ask ourselves such questions as: What are the essential characteristics of exposition? Under what circumstances should exposition be used? and What are the methods by which exposition proceeds?

Exposition is important because its function is closely related to the expansion of the material basis of our civilization and comes into our every-day necessity of answering the questions Why? and How? Its development as a distinct form occurred perhaps later than that of the others, or at least was more gradual; recently, with the increase in scientific pursuits, it has assumed a new significance. For the technical man—the scientist, the agriculturist, the engineer—exposition is the most immediately important of the four types of writing, for the technical man must instruct rather than entertain, must interpret principles and processes rather than characters and actions.

Exposition and Argumentation. Before passing to the essential characteristics of exposition, we shall do well to point out the inherent connection

of exposition with the reasoning process, and the necessity for a writer of exposition to follow the logical working out of his thoughts, whether in their casual connection or in their use as evidence supporting a contention. As already indicated the two types overlap; argumentation must lay a foundation in exposition before the terms employed can be presented intelligibly or forcefully, and exposition must proceed in a strictly logical manner from the simple to the complex, from the fundamental to the subordinate. In this interdependence it is important that the student understand what a syllogism is, how inferences are drawn from other statements of fact, and what the more common types of fallacies in reasoning are. The study of these matters belongs to a detailed study of argumentation rather than of exposition, but should be a part of the training of every person that expects to write technical exposition. The ability to think straight is certainly requisite in a scientist.

The Essential Characteristics of Exposition. The function of presenting information in answer to the thousand and one questions of the human mind, and adequately interpreting that knowledge to suit the needs of varying intellects, affords an attractive field of study. Exposition will demand certain qualities in itself if it is to be effective. Without at all implying that the characteristics essential to

exposition are not found also in the other types of writing, we name three which are vital: clearness, accuracy, and unity.

An explanation that does not make itself *clear* is no explanation at all. Literally, exposition is a setting forth (from the Latin prefix *ex*, out of, or away from; and the verb *ponere*, to place, to put); the word implies, therefore, that the meaning of the subject matter is made to stand out more distinctly, is simplified because it is no longer involved with anything else and is seen more clearly. An interpretation must succeed in making the subject matter better understood than it was before the interpretation was started. A writer of exposition must cultivate clearness of expression above all other qualities. He must be able to convey to a reader an idea in such a manner that the reader will have a perfectly intelligible and satisfactory understanding of the thought. The quality of clearness is closely related to another essential, to which we now turn.

The second characteristic is *accuracy*, which is involved in any attempt to secure clearness. Not infrequently a lack of clearness in expression is due to an incomplete grasp of the facts in the mind of the writer. Accuracy has a twofold application—the truth of the information, and the precision of the expression considered as English composition. The latter is the application that we have in mind

here, for there are no rules to be formulated whereby a person can always get the facts in his investigation. The human factor makes error liable. But in the phrasing of thought it is different. A loose or intricate sentence organization often defeats the real purpose of the thought that in itself is good.

Language is in reality a tool that requires skill to use it effectively; scientists do not tolerate careless or inaccurate use of their instruments and should therefore learn the right use of language, which may be considered another instrument of precision. Grammatical accuracy is not enough; precision of thought put in words is more than correct grammar. The ability to phrase nice distinctions of thought and exact shades of meaning is an essential characteristic of the writer of exposition.

The third quality of exposition, *unity*, means singleness of aim in subject matter and in treatment. Technical writing is direct, concise, plain, and definite. It does not deviate from the point in hand. Any initial interest due to the subject matter must not be lost by discursive or superficial treatment. Exposition must aim to keep to the topic strictly, for any digression to other fields, no matter how attractive they may be in themselves, tends to confuse the impression in the reader's mind. The style of writing should be clear-cut as well as clear. Unity includes this straight-away method of handling

a topic, as well as all that is usually presented in rhetorics under this heading as one of the three central principles of that subject.

The Forms of Exposition. Certain examples of exposition have already been mentioned. With some of them we shall not concern ourselves; with others we shall present the problems that are involved, in considerable detail. Guidebooks and handbooks, for example, are limited in scope and in form; they serve as convenient reference books, but are not usually read continuously from beginning to end. Textbooks are merely mentioned as exemplifying exposition; their preparation is not often taken up without a background of experience in the subject covered and therefore may well serve as a goal rather than as a practical model for the student. The essay, involving several literary and critical forms, really constitutes a field by itself. We have left: business letters, magazine articles, some forms of journalistic writing, reports, and specifications—the forms of practical technical writing such as men will be called upon to prepare in the course of their regular professional or business careers. The principles of exposition will be applied to the elements of these forms of writing. The writer of exposition must know the difference between giving directions in writing, and making an explanation.

The Methods of Exposition. The four types of

writing have their special problems; these are worked out by appropriate methods. The story-teller, the poet, the advocate, and the engineer each develops his method of procedure. For all, however, there is but one language; all must obey the same rules of grammar and must apply the same principles of rhetoric. That common fundamental medium must not be forgotten. The methods that are referred to are the ways by which that medium is made effective to accomplish certain definite ends. Differences come in the vocabularies, the processes of organization of material, and the needs of the classes of readers to be reached. Exposition as a whole, and the forms mentioned in particular, have their problems of diction or the use of words. It has also its problems of order that are just as significant as the building up of proof by the use of evidence in argumentation, or the construction of the plot of a novel or of a play. There is, further, a distinct objective for the writer of technical English, because of the somewhat limited, professional class of readers he has in mind.

The broad directions about visualizing the reader, selecting the material, and consulting the sources; the use of rhetorical devices of transition, proportion, and emphasis; and of course the strict observance of grammatical requirements—all hold in expository writing.

But exposition commonly proceeds according to

two main methods: the method of definition, and the method of analysis. These two will underlie the remainder of our discussion of the application of exposition to various forms of technical writing. The method of definition is explained and illustrated in Chapters II to VI; the method of analysis in Chapters VII to XV. Definition is concerned with the meanings of words and expressions; analysis is concerned with the organization of whole articles. The use of the right word at the right time and the construction of sentences with a unified thought are the problems of the method of definition. The arrangement of thoughts to accomplish a definite end, especially as these thoughts are considered in their larger aspects of co-ordination and adaptation, is the problem of the method of analysis.

EXERCISES FOR CHAPTER I

1. Clip from a newspaper an example of each type of writing.
2. Name five books that are examples of narration; of description; of argumentation; of exposition.
3. Formulate characteristics essential to narration; to description; to argumentation.
4. Report on the origin and history of the essay.
5. Name five famous essayists and writings by each.
6. Clip several extracts from a magazine or newspaper without titles; formulate titles for extracts exchanged with other pupils.
7. Discuss the following definitions of the types of writing:
   a. Narration is a record of events.
   b. Description is an attempt to make some one else see or imagine a thing as you see or think of it.

c. Description is giving the attributes of any object or conception.
d. Description is an account of the parts of a complex whole.
e. Description is a portrayal by language.
f. Argumentation is the ability to make people think and feel as the speaker thinks and feels.
g. Argumentation is the effort to make others believe as you would like to have them.
h. Argumentation is the art of persuading by logical reasoning.
i. Exposition is that form of discourse which has for its aim the unfolding of a subject.
j. Exposition is the overcoming of some obstacle in the way of understanding an idea.
k. Exposition is the succinct and orderly setting forth of some piece of knowledge.
l. Exposition is that form of discourse which proposes to make clear to the intellect an idea or related group of ideas.

8. Write four themes on the same subject, illustrating the four types of writing. Suggested subjects: A Football Game, A Ford Automobile, An Heirloom, My Bicycle.

BOOKS SUGGESTED FOR CONSULTATION

J. F. Genung: *The Working Principles of Rhetoric.*
R. A. Jelliffe: *Handbook of Exposition.*

CHAPTER II

DEFINITIONS OF WORDS

Application of Exposition to Words. In all types of writing words should be used with correct meanings, but in exposition there is more occasion to use new words, or words with special meanings, than there usually is in the other types. At least there is need to give the definition of words used, when there is any uncertainty about the sense involved. The language of science is exact. The terms of science are more nearly univocal than the terms of history, politics, education, philosophy, social life, etc., and yet there is constant need for watchfulness against misinterpretation. For example, words like state, democracy, school, wisdom, truth, home, gentleman, even when taken with a context, are given different interpretations by different people. On the other hand, scientific terms, such as geology, crystal, cell, root, spectrum, voltage, transit, and sun, do not give rise to varieties of interpretation. The meanings are more distinct. The writer of exposition, therefore, in order to

secure precision or accuracy, which is an essential quality in his writing, must be sure of his meanings, and must know how to give exact definitions if there is any possibility that his readers may not follow his thought easily. He must know about the sources of our technical words, and the methods of building up new terms to meet some real need in vocabulary. In this chapter we will take up the framing of definitions.

The Process of Definition. Definition is the process of separating out the thing being defined from all else, especially from anything that might be confused with it. Limits to the scope of the meaning of the word being defined are established with exactness. The process is analogous to the exercise, in geography, of bounding a country or a state. The content or range of a word is fixed by its definition. We are undertaking here the interesting task of applying the process of definition to the word *definition* itself. We shall have further help in understanding the meaning of the word if we look at its origin. The root of the word is the Latin *finis*, which is translated boundary, border, or end. The process is, therefore, to establish boundaries for the thought content of a word or term.

Ideas are almost always conveyed from one person to another by means of words; the exceptions of sign language and facial or other physical expression need not be considered. Sometimes ideas are

vague in a person's mind, and when expressed in words lead to misunderstandings and disputes. Sometimes ideas are abstract or subtle, and when put into words are hard to grasp. Before a subject is discussed the terms employed in that subject must be so presented that all who read will obtain from them the same meanings that the author does. The truth of a discussion will depend upon the definitions adopted; the definitions are but condensations of the truth of the thought. The meanings of all terms that are vital to the thought must be stated.

Kinds of Definitions. There have been several attempts made to classify definitions; the most satisfactory is undoubtedly the one that distinguishes but two: the formal and the informal. An informal definition is one that describes the term in a broad, human, or even popular way. A formal definition is one that follows a set method of stating the class to which the thing being defined belongs, and the essential characteristics which distinguish it from other members of that class. The formal definition is also called a logical definition, in which case the two parts are said to give the *genus* and the *differentia* of the object defined. These two Latin words, taken from the vocabulary of logic, indicate the including class, and special points found in the particular member being defined but not in other members of the class. The informal

and formal definitions may be illustrated by using the same word. A propeller may be defined informally by saying that it is similar to the fan of a windmill, except that its motion causes the supporting body to move through the air. A formal definition would be: a propeller is a bladed screw whose revolutions against air or water impart motion to a supporting body. In the former, we have a description in a comparison with a familiar object; in the latter we have the class of bladed screws named, and some qualities which will distinguish propellers from other screws, such as grooved screws, or more exactly from other bladed screws such as those which simply give motion to air or water, for example, a revolving fan.

The following tabulated arrangement will furnish the essential material for formal definitions:

WORD	CLASS (*genus*)	CHARACTERISTICS (*differentia*)
helmet	covering for the head	defensive, hard.
league	alliance	two or more nations or parties, support, help.
mullion	bar	dividing the lights of windows, slender.
thermometer	instrument	measure for temperature.

Dictionary definitions, particularly those of nouns, are formal in kind, although frequently they are

open to other objections which will be noted later in the chapter. Definitions in technical writing should preferably be formal definitions.

Methods of Definition. In phrasing definitions, whether formal or informal, a writer may use any one of several methods. These represent points of view or angles of approach on the part of the framer of the definition. Sometimes it is helpful to use several in connection with the same word. Possible methods and examples of each are as follows: (1) By looking up the derivation of the word one may incorporate the original or inherent meaning of the word or of its parts. A great many scientific words come from the classical languages—*e. g.*, planet, inertia, geology, machine, telephone, and metabolism. Frequently it is illuminating to learn the source of such words. *Inertia*, for example, is composed of a negative prefix and the Latin word for art, skill, or power; *geology* of the Greek words for earth and history or record; and so on with a long list of words, many of which are exceedingly interesting. (2) By quoting some expert who has framed a carefully worded definition in a discussion of the subject in question. This method is followed by dictionaries, as for example, Webster's *New International*, under the entry "riot," used as a law term, quotes from Hawkins, a noted English jurist, and then cites two or three passages that employ the term in its common meanings.

(3) By stating a meaning negatively, or telling what the term does not mean. The negative approach eliminates some meanings or classifications which do not apply to the term being discussed. Usually, of course, meanings that might possibly become confused with the term being defined, either by similarity of connotation, or through incomplete knowledge, are the ones that have to be ruled out. In his speech on Conciliation with the American Colonies, Edmund Burke suggests that the peace he proposes as a remedy is

> not peace through the medium of war; not peace to be hunted through the labyrinth of intricate and endless negotiations; not peace to arise out of universal discord, fomented from principle, in all parts of the Empire; not peace to depend on the juridical determination of perplexing questions, or the precise marking the shadowy boundaries of a complex government. It is simple peace, sought in its natural course, and in its ordinary haunts. It is peace sought in the spirit of peace, and laid in principles purely pacific.

Very frequently ground can be cleared of the underbrush of hazy or inadequate interpretations before the positive contribution is advanced. The method of negation is often helpful. (4) By citing an example of the application of the term. As has just been stated, dictionaries often cite quotations from writers to illustrate the meaning of a word; a similar practice is not unfamiliar in the classroom. A teacher asks what a three-phase wiring system

is; an observing student points to the system used in the building in which the class is sitting, and says, "That is a three-phase system." It is not strictly a definition; it does assist, however, in furnishing a clear interpretation of the term in question. (5) By making a comparison or a contrast that will bring out the meaning. Words frequently go in pairs or groups, for example: hypothesis and theory, ingredient and element, liquid and fluid, severe and strict. Definitions of the words in these pairs can best be given by pointing out the differences and the similarities of the two words as related to each other. If one of the pair were defined alone, there still might be some uncertainty in the minds of some people, but if both are discusssed the uncertainty will disappear. (6) By giving a more or less complete description of the term. Some words are so hard to define logically that the best that can be done is to give a concise statement or description of what the word designates. The best example of this is the word *electricity*, for which there is no satisfactory definition of the formal type.

Loose, illogical expressions, like "exposition is when you explain," or "argument is where you take sides on a question," are of course to be avoided.

Rules for a Definition. In addition to these methods of definition which set forth the funda-

mental approach to a term to be defined, there are several rules concerning the acceptable form of a definition. (1) In a formal definition choose as a class word a term that is neither too inclusive nor too small. This is frequently done by using an adjective with a noun. A large class increases the number of essential characteristics that must be mentioned, a small class lessens them. For example, to say that a piano is an instrument is to choose too inclusive a class word; to say that it is a musical instrument is better, but this is yet a class word that is larger than necessary; to say that it is a stringed instrument, or a stringed musical instrument, is to make the second part of the definition shorter and clearer than it would be otherwise. On the other hand, to say that an apology is an excuse made by or on behalf of a person to explain conduct that was open to misunderstanding, and then to say that an excuse is an apology made by or on behalf of a person to explain a neglect of duty, is to confuse the classification of the two words. Both words are members of an inclusive class like "acknowledgment" or "statement." (2) Use only simple and familiar words in a definition. If one has to look up the meanings of words used in a definition, the purpose of the definition is defeated. Samuel Johnson's famous definition of "network" illustrates this abuse: network is "anything reticulated or decussated at equal distances." Tech-

nical writers with a known audience of technical people are allowed, of course, to adapt their language to the intellectual range of their hearers; and dictionaries may be allowed to use large words instead of long explanatory phrases; but writers of textbooks or articles for general readers should avoid the mistake of Johnson. (3) Avoid all forms from the same root. To say that glaucescent is "having a somewhat glaucous appearance" does not help much, yet the dictionary so states. Use different as well as more familiar words. (4) Use positive expressions wherever possible. Sometimes the most suitable explanation of a term is the negative one, although generally the negative interpretation is less desirable. A positive definition may be ambiguous—*e. g.*, to say that a bachelor is a single man; the negative statement that a bachelor is an unmarried man, although of marriageable age and circumstances, is at once clearer and more accurate. Likewise, the negative explanation of negative words is frequently the most satisfactory—*e. g.*, involuntary, unnecessary, and such words as rough, hilly, and bitter, which are negative in relation to other commonly used words. (5) Be as concise as is consistent with completeness and clearness. Wordiness defeats the purpose of definition.

Synonyms. Another form of the process of definition is the employment of synonyms, which are

single words or brief phrases conveying a meaning closely similar to that of the original word. In strictness the use of synonyms is not another method of definition because it assumes a knowledge of the word that would be often unwarranted. In formal definitions the substitution of synonyms for class names has to be guarded against, and in informal definitions a synonym may be as unfamiliar as the original word, and used alone be insufficient. In some meaning, at least, a word and its synonyms are interchangeable or parallel. Very few, if any two words have exactly the same meanings or are precisely parallel in range. The real distinctions between words are brought out best by formal definitions, but frequently the differences are made sufficiently clear for ordinary purposes by the use of synonyms. It is the mark of a good writer to use synonymous expressions rather than to repeat words. The larger the vocabulary the more successful will be the employment of such substitutions, and the more likely will be the intelligent grasp by the reader of the meaning of the writer. Further, there is a personal satisfaction in the conveying of shades of meaning by a skillful choice of words. A writer, particularly a writer on technical subjects, should not be content to put down the first word that comes to his mind, but should be sure that the idea he has is exactly included in the language employed. A book of synonyms should

stand beside one's dictionary for easy reference. One of the best as well as the most recent is Allen's *Dictionary of Synonyms*, Harper & Brothers, 1921. Crabb's *English Synonyms* and Fernald's *English Synonyms, Antonyms, and Prepositions* give meanings and uses of words; Soule's *Dictionary of English Synonyms* gives an extensive list of words without meanings, but grouped according to shades of thought under each word entered, and has a complete cross-index; Roget's *Thesaurus of English Words* attempts an elaborate classification of the departments of knowledge, with all words grouped by part of speech and by shade of meaning, concluding with a full cross-index.

English is especially rich in synonymous expressions, as is shown by the fact, for example, that the *Century Dictionary* gives more than thirty words that are in part at least parallel in meaning with the word "give." The reason for the extensive variety of words in English is discussed in the next chapter, which takes up the sources of our language.

EXERCISES FOR CHAPTER II

1. Frame definitions of your own for the following words, and then compare with the dictionary definitions:

hat	shovel	automobile	mine (noun)
luck	hunger	grindstone	laboratory
dirt	profit	farm	justice

2. Use all the methods of definition with the following words:

carpet	magazine	park
liberty	emotion	virtue

3. Put down all the synonyms you can think of, without using any dictionary, for the following words:

distinct (adj.)	fix (verb)	plain (adj.)
attractive (adj.)	mold (verb)	revolution (noun)
attack (noun)	support (verb)	wisdom (noun)

4. Distinguish between the following pairs of words:

divide and dissect	road and street	power and ability
part and portion	sharp and keen	machinist and mechanic

5. Copy all definitions from your current reading, and tell whether they are informal or formal.
6. Comment on the uses of the word *engineer*.
7. Discuss the form of the following definitions:
   Loyalty is not the same as blind devotion.
   A dressmaker may be truly an artist.
   Mastery of method is the pathway to success.
8. Criticize again the definitions in Exercise 7 of Chapter 1.
9. Turn to a page of the dictionary at random, and make a list of half a dozen words showing how their definitions are connected with their derivations.
10. Find appropriate synonyms for the word "great" in the following paragraph, which is an exaggeration of the mental laziness of many writers:

    We were greatly surprised to see so great a crowd of people assembled, evidently for some great occasion. On inquiry we learned that a great man was to address the people on a subject of great interest. The great size of the field, which sloped like an amphitheater, enabled the great crowd to hear every word with great ease, and all listened with great attention to the great thoughts presented. (From Fernald's *Expressive English*.)

11. Take a paragraph from a magazine article and make lists of synonyms for the nouns, then for the adjectives, then for the verbs.

BOOKS SUGGESTED FOR CONSULTATION

R. W. Sellars: *The Essentials of Logic*, chap. 6.
J. W. Taylor: *Elementary Logic*, chap. 6.

CHAPTER III

THE SOURCES OF A TECHNICAL VOCABULARY

The Meaning of the Word Technical. The vocabulary of any branch of knowledge presents special features, both of range and of quality, as determined by the commonness of the subject in life and the historical sources of its theory and practice. The vocabulary of a subject will consist of the words that name the tools used, the raw materials, the processes employed in transforming the raw materials into the finished product, the results of the processes, the uses of the products, the qualities or characteristics of the whole or any of the parts, and any other essential feature connected with the work. A student or a workman must know the vocabulary of any field to be proficient in it. The vocabulary is in itself a tool that requires expert handling. The words of a particular subject, such as art, philosophy, law, science in general, or any special science, are called a technical vocabulary. By derivation, the word technical suggests something that is made, produced, or fashioned; it is applied to the ability or

skill to make something. From this it is natural that the word came to be used in the useful arts and in the sciences, especially the mechanical branches. In its broadest sense the word is applied to any trade or profession. The artist has a technical vocabulary, also the lawyer, the agriculturist, and the engineer.

The Importance of the Sources of a Technical Vocabulary. If the words pertaining to a particular subject constitute a tool for the follower of that subject, they need to be known thoroughly and accurately. This means more than an acquaintance with their spelling and their dictionary meaning. It means knowing something about the geographical and the historical development of the subject; it means understanding something of the composition of languages and their interrelation; it means appreciating how languages grow. The first of these three points varies, of course, with the subject, and cannot be included here. The second of the points will be discussed in this chapter, and the third in the next.

The Racial Contributions. Without attempting any discussion of the theory of language, or of the beginnings of tongues, we can gather together the results of the study of scholars and the changes of history in showing what we may call the racial specialties in vocabulary. No language is seriously one-sided, but the range of human experience

appears in varying degrees in the different tongues. Most peoples have made special contributions in some one or two fields of thought. The life and consequently the vocabulary of a people will be rich in certain elements and terms and poorer in others. A summary may be presented as follows, with examples in English:

Latin —words of government, law, and science—*e. g.*, republic, census, crime, mandate, solid, rotary.

Greek —words of art, science, and philosophy—*e. g.*, logic, geography, rhetoric, intone, cosmos, democracy.

Hebrew —words of religion, and imagination—*e. g.*, sabbath, satan, hallelujah, jubilee.

Arabic —words of trade and mathematics—*e. g.*, magazine, syrup, zenith, zero, algebra, cipher.

Keltic —words of home and folklore—*e. g.*, crock, taper, bargain, basin, clan, brogue, slogan.

Anglo-Saxon—words of conduct and morals—*e. g.*, friend, hearty, hope, wish, sorrow, love, hate.

Dutch —words of navigation and the fine arts—*e. g.*, dock, hull, yacht, landscape, easel.

German —words of geography, science, and civic life—*e. g.*, field, land, quartz, zinc, kaiser.

Italian —words of the fine arts, natural science, and philology—*e. g.*, camera, piano, stanza, folio, fresco, lava, cascade, volcano, stucco.

Spanish —words of adventure and discovery—*e. g.*, armada, filibuster, desperado, eldorado.

French —words of social life, law, and ceremony—*e. g.*, bouquet, debut, etiquette, program, trousseau.

The languages of other prominent peoples—the Russian, Swedish, Norwegian, Danish, Turkish,

Hindustani, Chinese, and others—have not been without their influence, but have not been so definitely specialized. They have contributed many individual words. We look at them all from the point of view of our English, for a reason that will be brought out in the next paragraph, but there has been an interrelation more or less strong among all languages. As world-wide communication has developed, the people of one country have come in contact with the people of another, and their languages have been mutually influenced, although not equally. Racial vocabularies have grown by a process of absorption of words in part, with such modifications in form as language necessities required. The tongues that have had the largest influence among existing languages are naturally those that have had the widest circulation through national expansion—*viz.*, German, French, and English among modern, and Greek and Latin among ancient languages. If the political promise of early Assyria or Byzantium, or of later Portugal or Spain had materialized permanently, we should undoubtedly find the languages of these empires exerting a larger influence than they now have, or than those of their contemporary rivals just mentioned. These five widespread tongues have been the languages of education, and until the present century the classical languages, Latin and Greek, have predominated in educational importance.

The Composite Nature of English. The speech of the English people is probably the most composite of any tongue known, ancient or modern; that is, it has in its vocabulary more words from sources outside its own racial inheritance than any other language. Many races have made contributions to its language in root words or grammatical forms, not primarily through literature brought into England, but chiefly through contact of people with people. The language is still growing in the double sense of an expanding word list and of an adoption by peoples to whom it comes as a foreign tongue. Some of the possibilities of such growth will be pointed out in the following chapter; the composite character of English is explained and accounted for in this.

The historical influences that have shaped the British Empire are too complicated to evaluate in a brief discussion, but anyone who is familiar with the history of England will recall that, beginning with the earliest historical period, the island has been invaded by several different races from the continent. These invading peoples came to stay for considerable periods, in most cases for several centuries each, and, of course, left very definite traces in the language, such as the place names, words of common domestic usage, and forms of inflection. Furthermore, the English people, since their national existence became firmly established, have been an outreaching, colonizing

people. In this way, the English have come into touch with lands in every part of the globe, from the peoples of which they have taken ideas that are reflected in our vocabulary. Some of these influences have been stronger than others, but whatever the degree of influence, the variety is an outstanding feature. No other country has had such a mixed development; other lands have been more continuously inhabited or controlled by a single race. As many as seven distinct racial contributions, of varying importance to be sure, are found in the language known as the English language: Keltic, Latin, Anglo-Saxon, Danish, Norman French, Dutch, and German. Figures for the percentages of these elements in the vocabulary as at present constituted cannot be given with accuracy; but Professor Kittredge, in the Introduction to Webster's *New International Dictionary*, says that about four-fifths of the vocabulary goes back to French and Latin combined; about 10 per cent may be Anglo-Saxon, 4 or 5 per cent Greek, and the rest, about 5 per cent, includes the other elements, such as Keltic, Teutonic, Asiatic, etc. When one tests the prevalence of use, however, a different story must be told, for a great many of the commonest words bearing upon everyday activities and home life come from the Anglo-Saxon, the Keltic, or the Teutonic; in literary usage, individual authors show decided tendencies—*e. g.*, Shakespeare

for Saxon, Milton for Latin, the Authorized Version of the Bible for Saxon again, and scientific writers like Huxley for Latin.

There are many interesting studies in the meanings of English words, not the least of which is the comparison of practically synonymous words from two sources. It will be evident that, with several sources for our present speech, there will be duplications, first of different words for the same object or idea, and second of similar words for very different objects or ideas. These facts account for much of the ambiguity of English words, and also for the richness of our speech in synonymous expressions. The good results have been mingled with the unfortunate.

When the Norman French became rulers of England, they brought a tongue that was little known to the inhabitants of the island. With educational facilities inadequate for teaching the new speech, the people learned it by its sound, rather than out of books. In order to make meanings perfectly intelligible to the people in legal and religious proceedings, the leaders developed the habit of using parallel words to express their thoughts; in this way there grew up the "doubles," one from the French (or Latin originally), and the other from the Saxon. The following are examples (the Saxon word being given first in each instance): building and edifice, try and endeavor, fatherly and paternal,

aid and abet, will and testament, acknowledge and confess, lowly and humble, love and cherish, work and labor, promise and vow, loathe and despise.

The Characteristics of American Speech. The language influences in the speech of the people in the United States have been even more numerous than those in England. English on this side of the Atlantic has all the historical factors of insular English, plus those of the other European nations that colonized here—*e. g.*, Holland and Spain; plus those of the American Indians; plus those of the peoples admitted in large numbers by our liberal immigration policy of the last seventy years. From colonial times there has been less restraint here in matters of purity of language, and less insistence upon the inflected forms of the past. The meanings of many words are noticeably different here from those in England. Some have found these differences so great as to warrant speaking of an American language, paralleling an American literature, or corresponding to our political independence. In spite of the differences, however, the weight of the argument is undoubtedly against such a proceeding, for the following reasons: (1) Language grouping need not follow state lines—there is a great danger in a principle that would insist that it must. (2) British colonies are not justified in giving up the name English as applied to their speech. The confusion of a Canadian, an Australian, a South

African language, or even dialect, would be unendurable; and these would be quite analogous to an American speech, except for the political relationship. (3) The similarities between American and English greatly outweigh the differences; the differences illustrate the national characters—*e. g.*, the colloquial, enthusiastic, slangy traits in Americans, and the serious, restrained traits of the Briton.

The Application to Technical Writing. The student of science in any of its branches will come into contact with some other language, probably Latin, or German, or French. He will study Latin as a foundation language, and the modern tongues because of their helpfulness to him in their current literature, varying according to the branch of science he pursues. If he has reviewed the history of science, he will note that the ancient peoples that did the most in science were the same peoples that expanded most in national life and empire building. Although science had its beginnings in Babylonia and Egypt, the national life and the languages of these peoples were quite inadequate to transmit or preserve the scientific learning that was accumulated. With Greece and the Roman Empire, however, the story is different. Both the national life and the language were capable of handing down its scientific achievements. Of modern nations those that have made the greatest contributions to science have also had the better lan-

guage instruments—*viz.*, Italy, Germany, France, and England. By studying one's special branch of science historically, one will necessarily find a vocabulary, or at least the sources of the English vocabulary pertaining to it, with which he must be familiar. As science has influenced practical life, so the language of the people that have contributed to that science has made itself a part of the present English vocabulary.

Separate Words. In addition to these general backgrounds there are a great many separate words or terms whose interesting history will shed valuable light upon the understanding of the subject matter. Some of these words have changed from proper nouns, the names of men who were inventors or discoverers of the item in question—*e. g.*, macadam, watt, ohm, volt, galvanize, bessemer, or names of places—*e. g.*, copper, worsted, ammonia, lumber, etc.; some have come from natural objects with a scientific meaning —*e. g.*, eye, head, foot, leg, arm, ear, socket; some have come from animals—*e. g.*, frog, horse, antenna; some have come from household life—*e. g.*, cradle, hood, shoe, cap, collar; some have come from resemblances—*e. g.*, I-beam, A-frame, S-hook, Z-bar, T-square; some have been manufactured outright—*e. g.*, kodak, gas, uneeda. The writer who knows the history of his words, words that he has to use every day in his professional work, will write with more interest and stronger appeal to his readers.

EXERCISES FOR CHAPTER III

1. Bring in lists of words you can find derived from other languages.
2. Bring in a list of Americanisms with British equivalents.
3. Discuss the important contributions to science from Greece; from Rome; from Italy; from Germany; from France; from England; from the United States.
4. Find from a dictionary the language source of the following words:

scientific	speedometer	phonograph
technical	petroleum	automobile
manufacture	dictionary	submarine
architecture	barometer	alkali

5. Write a theme on the Value of Knowing the Classical Languages.
6. Write a theme on the Value of Knowing a Modern Language.
7. In a magazine article underline words derived from Latin.
8. In a magazine article mark all words derived from proper names, whether capitalized or not.
9. Identify the following coined words, and so far as possible explain their composition:

Arco	Nabisco	Resinol
Carbona	Neolin	Rexall
Feltoid	Nujol	Sanatogen
Fiberloid	O-Cedar	Socony
Jello	Postum	Tydol
Lyknu	Prestolite	Valspar

BOOKS SUGGESTED FOR CONSULTATION

H. Bradley: *The Making of English.*
W. Libby: *An Introduction to the History of Science.*
H. L. Mencken: *The American Language.*
J. B. Opdycke: *English of Commerce.*
J. B. Greenough and G. L. Kittredge: *Words and Their Ways in English Speech.*

CHAPTER IV

THE FORMATION OF TECHNICAL WORDS

Language Expansion. As the conditions of life have changed, languages have expanded in order to voice the new ideas called forth. The wonderful development of material civilization during the past century has left few human activities the same as they were; in some departments the changes have been slight, in others they have been more radical. Parallel with the material enlargement has come a new philosophical interpretation of life. These two, constituting the advance of science, have almost rebuilt the vocabularies of the Western World. The era of electricity, of the gasoline engine, of specialized industry, of evolution, to say nothing of the era of the World War, has brought tremendous additions to the language of science. Although we are concerned especially with the English language, the expansion seen there may also be seen in German, French, and other modern tongues of progressive peoples. The making of dictionaries has proved to be an exacting undertaking that needs frequent revision. Our speech is a living, vital speech.

Methods of Language Growth. Each language, or at least each family of languages, has its own method of expansion. Inasmuch as English is complex, it adopts several methods. The following five are distinguished: (1) Going back to a classical language for a root form, to which may be added a prefix or a suffix; for example, expansion, progressive, dictionary. (2) Taking a native word and adding a new meaning to it; this native word may in turn be from an ancient source, but established as a familiar word in regular form. Examples are: control, used of the apparatus which directs or controls a machine; initiative, used of the political means for starting legislation; bank, dip, pilot, or wing, as used in aëronautics; many slang expressions. (3) Combining two or more established words in such a way as to secure a word with a new meaning; for example, aircraft, understanding, race suicide. (4) Borrowing a word outright from a foreign language, when there is no equivalent in English, or when the normal equivalent is already used; for example, chauffeur, souvenir, matériel, entrepreneur, gymnasium, habitat. (5) Creating a new combination of letters for an artificial word, such as the words mentioned at the close of the preceding chapter.

The Romance languages have commonly gone back to the parent Latin for a root word, to which have been added prefixes or suffixes. German has

used its own roots, either modifying them with consistent inflections or compounding them with other established words, frequently with astonishing results so far as length is concerned—*e. g.*, *Naturwissenschaft.* English in its early form expanded like the Teutonic languages, to which it is related; but English as affected by the Norman French began to show the method of the Romance tongues, with its large percentage of Latin roots. English, therefore, has not shown consistency with either source; it has mixed the methods as well as combined the sources, so that it has even united words of Teutonic and of Latin origin into one acceptable English word—*e. g.*, gentleman (Fr. gentil and Ger. Mann). Further, English has shifted the part of speech of a word; frequently it has made a noun do duty as a verb, or as an adjective, without changing the form of the word in any way. This looseness of method in English has made the task of learning the language a difficult, but at the same time a fascinating, one. Some further comment is necessary about two of the methods.

Use of Prefixes and Suffixes. The classical languages and the languages derived from them employ particles called prefixes and suffixes to build up words. These particles are seldom or never used as separate words, although a very few are prepositions, and they have no inflected forms.

The words prefix and suffix illustrate in themselves their literal meanings: the latter part of the two words is the same, and is from the Latin *figere*, meaning *to fix, to attach;* in the one word this root is combined with the particle pre-, and in the other word with the particle suf-, a variant (for reason of euphony) of sub-. Pre- means in front of, and sub- means under or after. Hence we have the meanings: a particle placed before a word, and a particle placed after a word. The same root word may have both a prefix and a suffix—*e. g.*, e-volu-tion; a word may have two prefixes, especially if the first has a negative force—*e. g.*, mis-in-form, un-pre-meditated, also con-de-scend, re-sub-mit; a word may have two suffixes, especially when one designating a noun is added to one designating an adjective—*e. g.*, in-quisit-ive-ness, multi-tudi-nous, mut-abil-ity; sometimes a word has two of each—*e. g.*, in-ex-cus-able-ness, dis-pro-port-ion-ate. The effect upon the number of words capable of being formed from one root is obvious; the advantage in not having as many roots as words is equally obvious.

Common Prefixes. It will be well to have a list of the more common prefixes and suffixes before us for use in forming compounds. Prefixes from Greek and from Latin overlap in meaning in some instances; the Greek are to be used with Greek roots and the Latin with Latin roots.

Greek Prefixes

Particle	Meaning	Example
a-, an-	not, a negative	apathy, agnostic, anarchy
amphi- (ambi- Latin)	around, both	amphibian, amphitheater (Lat. ambiguous)
ana-	up, increasingly	analysis, anagram
anti-	against, opposed to	antipathy
apo-	upon	apology, apoplexy
cata-	down, decreasingly	catastrophe, catalog
di-, dis-	twofold	dissyllabic
dia-	through	diameter, diagnosis
ec-, ex- (ex Latin)	out of, away from	eclipse
en-	in	enthusiasm, encyclopedia
epi-	upon	epidermis, epigram, epicycloid
eu-	well, pleasing	euphony, eulogy
hemi-	half	hemicycle, hemisphere
hyper-	more than, excess	hyperbola, hypersolid
hypo-	under, beneath	hypodermic, hyphen
meta-	between, beyond	metamorphosis, metaphor, metaphysics
para-	beside, along with	parallel, paragraph, paradox
peri-	around	perimeter, periscope, periphery
poly-	many	polygon, polytechnic, polyphase
pro-	in front of	proboscis, program
syn-, sym-, syl-	with, together	synthesis, sympathy, syllable, synonym

Latin Prefixes

ab-	away from	abnormal, absent, abscissa

Particle	Meaning	Example
ad-, ac-, af-, ag-, al-, an-, ap-, ar-, as-, at-	to, toward	advance, affix, aggressive, assent, attract
ante-	before, in front of	antecedent
bene-	well, goodly	beneficial
bi-, bis-	twofold	biscuit, bisect, biplane,
circum-	around	circumference, circumnavigate
com-, col-, con-	with, together	compound, collect
contra-	against, opposed to	contradict, contraband, contrary
de-	apart from	deteriorate, defect
dis-, dif-	separation, negative	dissimilar, disconnect, diffuse
ex-, ef-, es-	away from	experiment, effervesce, escape
extra-	excessive, unusual	extraordinary, extravagant
in-, il-, im-, ir-	in, to	incandescent, illuminate, irrigate
inter-	between, into	interurban, intermediate
mis-	wrongly	misuse, misspell
ob-, oc-, of-, op-	against, toward	obscure, obtuse, oppose, offer
per-	through, by means of	perform, perennial
post-	after	postpone, postnatal
pre-	before, in front of	prefix, prepare
pro-	for, on behalf of	proclaim, pronoun
re-	back, again	repeat, rewrite
semi-	half	semiannual, semicolon
sub-, suc-, suf-, sug- sup-	under, after	subtract, subway, suggest, support
super- (Fr. sur)	above, over	superintend, superstructure, surmount, survey
trans-	across	translate, transit

Common Suffixes. Suffixes are placed after the stem portion of the complex word. Many of them denote the part of speech of the entire word.

GREEK SUFFIXES

PARTICLE	MEANING	EXAMPLE
-ic, also Latin, -ique French	adjective; pertaining to	volcanic, scientific
-ism	noun; fact or state of being	barbarism, synchronism
-ist	noun; person who acts	physicist, violinist
-ize	verb; to render, to make like	systematize, Americanize
-sis	noun; that which is	analysis, electrolysis
-ter, -tron	noun; object	theater, electron
-y, -ia	noun; quality, art	petrography, melancholia

LATIN SUFFIXES

-able, -ible	adjective; power	portable, terrible
-age	noun; act or process	passage, carriage
-al, -ical	adjective; belonging to	royal, geological
	noun; action	arrival, perusal
-an	adjective; belonging to	suburban, American
	noun; person, agent	molluscan, musician
-ance, -ence	noun; quality, state	abundance, circumstance
-ancy, -ency	noun; quality, office	superintendency
-ant	adjective; participial use	pendant
	noun; agent of action	servant, attendant

Particle	Meaning	Example
-ary	adjective; pertaining to	necessary, contrary
	noun; place or thing, where	dictionary, constabulary
-ate	verb; causative	concentrate, punctuate
-cle, -cule	noun; diminutive	particle, animalcule, molecule
-in, -ine	adjective; like, characterized by	masculine, bovine
	noun; possession	medicine
-ion, -sion, -tion	noun; act or state	supposition, accession
-ise	verb; to make	devise, advertise
	noun; state	surprise, treatise
-ive	adjective; relating to	conclusive, adjective
-ment	noun; state, result	fragment, document, government
-mony	noun; condition	testimony, harmony
-or, -er, -ar	noun; agent, quality	donor, error, adviser, beggar, doctor.
-ous, -eous, -ious	adjective; possessing	poisonous, gaseous, gracious
-tude	noun; quality	fortitude, aptitude
-ure	noun; act, process	signature, pleasure, picture

Anglo-Saxon Forms. In Old English there are several prefixes and suffixes that are used also as independent words; they are still so used, but perhaps as frequently in combination with other words. The list of prefixes includes:

a-	at, in, on	aboard, ashore, afire
be-	by, with intensive force	beside, belabor

Particle	Meaning	Example
for-	negative, against	forget, forbid, forsake
fore-	before	foresee, foreman
out-	beyond	outrun, outweigh
over-	above, more than	overtake, oversee
under-	beneath	undertake, underrate
with-	from, against	withdraw, withstand

The list of suffixes includes:

-craft	art, skill, trade	statecraft, aircraft
-ful (l)	full of, characterized by	wonderful, careful
-hood	condition, quality	childhood, hardihood
-less	without, lacking	powerless, wireless
-ship	condition, office	scholarship, authorship
-some	like, same	bothersome, lonesome
-ward	direction of	backward, northward

In addition, there are un- with a negative force; -ing as a participle ending; -ly as an adverbial ending; -ness as a noun designation of quality, and a few others.

The Literal Meaning of Compound Words. It will prove helpful to our vocabularies if we analyze compound words for the literal meaning of their parts, and conversely, express in one word the meaning of a phrase or descriptive group of words. For the analysis of compound words the following diagram is convenient:

Word	*Prefix*	*Root*	*Suffix*	*Meaning*
information	in-	forma-	-tion	noun; showing state of being put into form.
proportionate	pro-	port-	-ion -ate	adjective; pertaining to being for a share or part.
advertise	ad-	vert-	-ise	verb; to make to turn toward.

For the condensation of phrases which contain literal meanings into single words composed of root and particle, the following plan is suggestive:

The travelers (made-to-sail-around) the world, or circumnavigated.

The next task was to build the (part-that-was-erected-above) of the factory, or super-struct-ure.

Compounding Separate Words. The second method of making new words in English that needs further explanation (the third method in the list on page 39) is that of combining two existing words to form a word with a different meaning. There are few rules to govern the process, but we may distinguish three stages or steps, as follows: (1) The use of two separate words in association, each maintaining its identity. The words are written together, but as separate words; they have a place in a dictionary as though they were a new expression, however, and as a matter of fact are new terms. Usually the two are used as a noun, even

though each one may not be a noun. If both are nouns, the first loses its force as a substantive and becomes an adjective. Examples are: piston rod, iron ore, cast iron, gas engine, street car, sky line. (2) The use of two words united by a hyphen. This mark of punctuation brings together the two words more closely than the space does, and is the means of providing a distinctive connotation for the hyphenated expression. There is no clear rule when the hyphen shall be used; usage and the special meaning of the combined words determine whether it is used or not. In some cases the hyphen is necessary, to distinguish the combined expression from the two words written separately—*e. g.*, note the difference between green-house and green house; between iron-saw and iron saw; between poor-farm and poor farm. The following are commonly written with the hyphen: feed-pipe, fire-brick, high-pressure, blue-print, short-story, safety-valve, gas-oven, etc. (3) The complete union of the two elements to make a new single word. The meaning of the two words combined is so distinctive and useful that not even a hyphen is necessary. This group is not so large as the other groups, and has been arrived at by a process of development that may in some cases be traced. Examples of unified words are: horsepower, candlepower, railroad, substation, skyscraper, steamship, gaslight, and the directions northeast, southeast, etc. In some instances the

three stages are discernible in the same two words, revealing the changes in current opinion and in the importance of the object in question. For example, railroad was written as two words—rail road—when the institution was new; later, as the name became more common and the institution better established, a hyphen was used to connect the two words —rail-road; now the two words are invariably written solid, though the common abbreviation is continued as R. R. Much the same is true of the words horsepower and candlepower. In most cases, then, the only criterion for the form of the compound is usage; although we find substantives used rather freely as adjectives, the formation of really new words proceeds slowly. An author must justify his use of compounds, if they are to have standing.

Changes in Part of Speech. Almost every possible combination of parts of speech is found in English compounds. The second of the two elements is invariably the more significant, the former qualifying it in some way. The part of speech of the compound is not limited, however, to that of the second element. To show some of the possibilities let us group compounds by the second element. With a noun may be put another noun (the most extensive class)—*e. g.*, windmill, football, boat house, water-jug; an adjective—*e. g.*, highroad, hothouse, yellow-hammer; an adverb—*e. g.*, overcoat, downfall, sometimes; a verb—*e. g.*,

scarecrow, stay bolt, breakfast. With an adjective may be put a noun — *e. g.*, sea-worthy, weather-wise; another adjective—*e. g.*, highbred, high strung; an adverb—*e. g.*, over-much, evergreen, inmost; a verb—*e. g.*, slipshod. With an adverb may be put a noun—*e. g.*, runner-up; a pronoun—*e. g.*, whichever; a verb—*e. g.*, layover, breakdown, run-away; or a preposition—*e. g.*, within, throughout. With a verb may be put a noun—*e. g.*, landslide, home run, wiredraw; an adjective — *e. g.*, whitewash, widespread; an adverb—*e. g.*, overtake, inlay, outlook, understand. These examples will all be found as independent entries in the dictionary; they are to all intents and purposes new words in our language. There are a few compounds that involve more than two words—*e. g.*, inasmuch, whatsoever, nowadays. It will be noted that almost all of these compounds are Saxon words, or Teutonic. The principle of the Romance tongues is to form compounds by means of the particles, the principle of the Teutonic tongues to combine established words. Our modern American speech adopts both methods, and is not always consistent in its use of sources.

Possibilities for New Words. Both of these methods are still open; we are forming new words every year; dictionary making is a continuous process. In our everyday speech the Teutonic method prevails; in our scientific vocabulary the Latin

method prevails. If one knows a score or more of Greek and Latin roots, both nouns and verbs, he has the possibilities of adding to his English vocabulary several hundred words. The following list will readily suggest ten or more words each:

Greek Nouns		Latin Nouns	
hydor	water	finis	end, limit
chronos	time	forma	form
onoma	name	passus	step
phone	sound	pax	peace
aer	air	lux	light
metron	measure	dux	leader
logos	word, speech	annus	year
autos (pro.)	self	lex	law

Greek Verbs		Latin Verbs	
tithenai (thesis)	to set	portare	to carry
graphein	to write	trahere	to draw
kritein	to judge	scribere	to write
philein	to love	facere	to make
		mittere	to send
		pressare	to press

The Question of Artificial Languages. The possibility of the growth of language has been a contributory cause in the various efforts to create a new artificial language—*e. g.*, Volapük, Ro, and Esperanto. The argument goes that if languages are to grow they should conform to scientific principles. No language now in existence follows the laws of theory absolutely, and probably never will. Therefore a careful systematic working out of grammatical laws will be an advantage for all

peoples. The world-unifying purpose is also prominent in the minds of those who advocate a single artificial tongue, and furnishes a very commendable motive. In fact from a theoretical point of view there is much to be said in favor of such a plan. On the other hand, the difficulties are more insurmountable than with the universal adoption of the metric system. If simplified spelling has been hard to accept, an artificial language will be much harder. The question of the national literatures, the educational program, the double standard that would at least for a time have to be tolerated, and the difficulties of a spoken as well as of a written tongue, make the adoption of any universal language, particularly an artificial one, practically impossible.

Diction. The whole matter of the selection of words in writing, whether prevailingly Latin or Saxon, learned or vulgar, unfamiliar or common, is included under the heading Diction. The word is directly derived from the Latin term for word or saying. Every handbook has a list of words and expressions that are not permissible according to good English usage; it is very much worth while to examine such a list with care and to avoid the habitual use of any term that has not won its way into the better grade of modern publications. Instead of presenting a list here, which would of necessity duplicate lists previously printed, we will

summarize the practice that is widely approved, even though not universally adopted, under the heading

RULES GOVERNING DICTION

1. Avoid the use of obsolete words.
   e. g., gotten, proven, hath, goeth.
2. Do not use a foreign word when there is an English equivalent.
   e. g., depot, per annum, etc.
3. Avoid provincialisms, or words associated with limited sections.
   e. g., reckon, right (as an adverb).
4. Avoid improprieties, or words taken out of their correct part of speech.
   e. g., a combine, to neighbor, ain't.
5. Avoid slang.
   e. g., mad, gym, rep, rough neck, up to you.
6. Avoid illogical constructions.
   e. g., different *from*, independent *of*.

Condensed still further, a law may be formulated thus: The burden of proof is upon the one who uses any word of irregular formation, or out of its proper meaning. Good usage requires no justification. A law formulated in this way will admit of exceptions upon proper occasions, but will ordinarily keep written English up to a high level of literary values.

EXERCISES FOR CHAPTER IV

1. Make as many words as you can by adding prefixes or suffixes to these root forms:

chronos Gr. for time.	graph- Gr. for to write.
finis L. for end.	lex (leg-) L. for law.
mitt- (miss-) L. for to send	press- L. for to press.

2. Distinguish between the meanings of the following words:
   subscript and subscription.
   detector and detective.
   intensive and extensive.
   expire and inspire.
3. Express the following phrases in single words that include a prefix or suffix or both:
   a-state-of-being-seen-plainly.
   to-make-under-a-rule.
   a-state-of-not-being-grasped-before.
4. Take a news-story and underline all words containing a prefix or suffix. Do the same with an editorial and a newspaper poem. Compare the frequency of compounds in the different types of articles. Do the same with a magazine article.
5. Take a news-story and underline all the compounded words not involving a prefix or a suffix. Do the same with an editorial and a newspaper poem. Compare the frequency of the compounds in the different types of article. Do the same with a magazine article.
6. Make a list of all the words you can find borrowed directly from some other language.
7. Report on Esperanto.
8. Look up the derivation of the following words:

macadam	bessemer	pasteurize
babbitt	copper	worsted
ammonia	cambric	mazda
electricity	gasoline	atlas

9. Discuss the Value of Slang.

BOOKS SUGGESTED FOR CONSULTATION

W. D. Lewis and M. D. Holmes: *Knowing and Using Words.*
H. S. V. Jones: *Words and Sentences.*

CHAPTER V

THE IMPORTANCE OF THE SENTENCE IN EXPOSITION

Grammatical Requirements. After words, the next significant unit of language is the sentence. Just as the writing of exposition requires the right use of words, so it also requires the use of effectively constructed sentences, including their correct punctuation.

A sentence is defined as, "the expression of a complete thought." A word is a name of an object or idea, and is, therefore, only the suggestion of a thought. A sentence says or asks something about a single thought, as named by a word, using that word usually as the subject of the sentence. Some one of the various possible outworkings of the suggested thought shapes itself into a sentence. A sentence is a distinct advance over a word.

The working out of a sentence must follow certain lines that we call rules of grammar; it is neither complete nor correct if it does not obey these rules. But after a sentence meets these grammatical requirements there are great possi-

bilities for effectiveness or lack of effectiveness. It is with these further possibilities that exposition has to do. We recall, however, that grammar names three kinds of sentences: the simple, the compound, and the complex. The last two may be combined to compose another intermediate type—the complex-compound. Grammar also designates that the essential parts of a sentence are a subject and a predicate; the predicate includes a verb, and if the verb is transitive, a direct object, or if the verb is intransitive, it may stand alone, have an indirect object, or a subjective complement. Grammar controls the uses of the various parts of speech in sentence construction, the agreement of subject and verb, the agreement of words and their modifiers, the uses of phrases and clauses, the inflected forms of nouns and pronouns, the conjugation of verbs, the use of infinitives and participles, and the proper subordination of thought in a sentence. Every person should have the ability to analyze a sentence —that is, to determine the skeleton framework of it, and the relation of all subordinate material to this framework. No one can presume to write effectively, not to say acceptably, unless he understands the grammatical laws of sentence structure.

Rhetorical Requirements. Besides the requirements of grammar are the principles of rhetoric, which present the relations of the parts of a sentence to each other, with reference to order, variety,

unity, coherence, and emphasis. The study of rhetoric is quite distinct from the study of grammar, although rhetoric presupposes grammar. Rhetoric goes to a higher plane, as it were, and presents certain possibilities in the phrasing and the arrangement of thought, all of the possibilities being strictly grammatical. The function of rhetoric is to render the expression of the thought more forceful, more clear, more attractive. Its appeal is to the skill as well as to the knowledge of the writer. The effective use of the principles of rhetoric enables a writer to avoid looseness of sentence structure, indefiniteness of thought expression.

The technical writer will look upon grammar and rhetoric much as a literary writer will; no writer may neglect them. A knowledge of grammar and rhetoric is essential. The purpose, however, of the literary writer is somewhat different from the purpose of a technical writer. He generally has an artistic appeal in mind, or an emotional element which is closely associated with attractiveness of sound or form—the musical or rhythmical quality that is a property of words as well as of song. The instructional purpose is not neglected, and is oftentimes achieved indirectly with as great success as it is directly. The writer who aims at producing literature pays deliberate attention to beauty of form to match the quality of thought; or perhaps an inherent, unstudied ability to adapt

form of expression to nobility of thought has enabled a writer to produce genuine literature. The writer of technical exposition puts instruction foremost; he aims to convey information in as clear and at the same time as concise a way as he can. The attractiveness of form, the employment of figures of speech in rhetorical usage, the climactic or periodic structure—these and other points of rhetoric are of secondary interest to him. Narration, description, and argumentation may have their long, involved sentences without much, if any, loss in effectiveness, but exposition cannot afford to run the risk of burying the thought in words. The qualities essential to exposition as a type of writing are the qualities that a writer of technical discourse must cultivate. Those qualities have been named as clearness, accuracy, and unity. Let us find how the writer may secure these qualities in his sentence organization.

Securing Clearness. Clearness cannot be a quality of a whole composition unless it is found in the separate sentences of the composition. A failure to secure clearness may be due to a lack of vocabulary—*i. e.*, of words adequate to embody the thought; such a lack of vocabulary is, of course, most evident in the cases of beginners and foreigners struggling with language difficulties. This is by no means the only reason for a lack of clearness, but when found is to be overcome only by long,

patient study of words. The other faults that violate clearness can be overcome by due care in handling the sentence. The more outstanding faults that destroy clearness are wrongly placed sentence elements, or a change in point of view; suggestions for securing clearness are therefore:

1. Be sure that modifiers really affect the words they should. Adverbs are the chief source of trouble, as is shown in the following sentences:

The one trouble with this magazine is that it contains only the views of the company that puts it out.

The high schools are not nearly graduating as many students as enter.

After being arrested and paying his fine, the offender can start operations again and can make enough before being arrested again not to feel the serious effects of the previous one.

No thought is generally given to the literary side of writing.

In these illustrations the adverbs are not next to the words that they really modify.

2. Do not omit any sentence element that is necessary for grammatical or logical connection of thoughts. Often a writer fails to put down on paper a word or a connecting thought which formed a link in the chain of his thinking, and the omission of which leaves a gap that is hard for the reader to cross. Notice these examples:

Mr. Allen was evidently a naturalist very much interested in all kinds of Nature, especially birds. (Birds are not a kind of Nature; a connecting thought is missing.)

In my own experience, I have found that I never secured any benefit from study when I felt like doing anything but studying. (The time relation here needs a clearer and fuller statement.)

Not only does Germany send its salesmen, but its engineers and politicians also to foreign territories, well versed in the tongue of the country in which they are to reside. (A relative pronoun is necessary, and a verb, to introduce the clause beginning well versed; the word *also* is misplaced.)

Collection letters are written on the principle of collecting the money but keeping the customer. Courtesy but firmness must be shown. (A thought in between these two sentences, connecting them more closely, has been omitted.)

3. Do not change the point of view, either in person, number, or subject matter, in the course of a sentence. When one starts a sentence on a particular line of approach, he should maintain that viewpoint all the way through. The following sentences illustrate a change of point of view:

In such cases one should read something that will take your mind off your work or study. (Change from third to second person.)

All may gain knowledge, pleasure, a finer and broader understanding and sympathy, entertainment, a knowledge of human nature, and last but by no means least, knowledge that will aid him in his daily work. (Change from plural to singular number.)

Securing Precision. The characteristic of accuracy or precision is essential in expository writing. The violation of it produces vagueness of statement. We are not concerned here with misstatements of

facts so far as the truth of the facts is concerned, although of course that is a most vital factor in scientific writing; we are concerned with a failure to convey an accurate meaning from the point of view of the reasoning or logic of the sentence. If a sentence is ambiguous or vague in its meaning, or illogical in its organization, it is an example of the fault referred to here. In order to secure precision a writer should observe the following suggestions:

1. Complete all statements involving comparisons. Frequently the second half of a comparison is readily understood although not stated explicitly; the fault is not one of a lack of clearness, but only of a lack of completeness. Sometimes the context will make clear the meaning when a single detached sentence will not; it is a safe rule, however, to say that every sentence should have within itself all the elements for a full, complete meaning. The following sentences show this point:

Vermont life is very aptly described, more as an inhabitant than an outsider. (An illogical reference.)

Man's thinking brought about such beginnings that enabled subsequent customs and ways to be added to this basis. (The thought of the sentence is incomplete within itself.)

As far as existence is concerned, he leaves the world at quite an early age. (The meaning is not precise; there seems to be duplication of thought.)

If a young engineer is sent to a foreign land to pursue his profession, he will soon learn the language of the country

in less time and more thoroughly, in fact this is the best way to learn a language. (The second half of the comparison is omitted.)

2. Give reasons and causes in logical order. In particular avoid the expression "the reason is because" and use the words "due to" as an adjective and not with a verb. These sentences are examples:

The reason an engineering course is so hard is because there are so many subjects to be studied in only four years. (Say The reason . . . is that there are, etc.)

He found the work very difficult due to his lameness. (Say "because of his lameness" or The difficulty of the work was due to, etc.)

3. Be sure that all pronouns have definite and correct antecedents. Here again the fault is not always one of clearness; the meaning may be clear, when it is not precise. There are several ways in which the reference of relatives may lack precision: no antecedent at all may be expressed, two words may be possible antecedents for a pronoun, an idea rather than a definite word may be the antecedent. In some of these, especially the last, no objection can be raised provided the sentence is otherwise effectively written; the indefinite pronoun in such expressions as "it rains" is recognized as good usage. In general, however, every pronoun must refer to a perfectly clear and correct antecedent expressed as a prominent rather than a subordinate

grammatical part of the sentence or immediate context. The following sentences illustrate faulty reference of pronouns:

He likes baseball but can say nothing good for football, which he thinks is unfair because they are allowed to send in another man when one is injured. (No antecedent for "they.")

Finally it swung open and in so doing encountered John's fist which in turn shattered the pane of glass and incidentally cut John's hand. (Antecedent of "which" is fist when the first part of the clause is read, but is "pane" when second part of the clause is read.)

Although I do not entirely agree with the essay, I do agree with some parts of it. This philosopher has exaggerated this a little, I believe. (Antecedent for second "this" is not stated.)

He explains the telautograph, located at the bank-cashier's window, by which he can in a very few moments find whether or not a customer's account is good. (Antecedent of "which" is not the noun it stands nearest.)

The only way to keep informed in regard to European progress is to read foreign magazines which is impossible without a knowledge of the foreign language. (Antecedent of "which" is the whole idea.)

In the introduction of this article, which is long, he gives some reasons for the present high prices and the conditions to which they may be attributed. (Is it the introduction or the article which is long?)

4. In using participles, either present or past, or gerund phrases, be sure to express in close association the noun or pronoun with which they agree in thought. An exception that is more apparent than real, is the case of an imperative verb, whose subject is understood; an example is the preceding

sentence, in which the gerund phrase "in using" agrees with *you* understood, the subject of "be." The failure to observe this rule leads to the ludicrous errors of many faulty advertisements. Some examples of its violation follow:

By using these, the cost of handling and transportation is greatly reduced, which is a large item of the basic cost of the product.

Any of the five senses may be used in describing an object.

In making the print, the paper is easily torn.

When using the crowbar, the product of the force arm, or distance of the force from the fulcrum, times the force, equals the weight times the distance of the weight from the fulcrum, or the weight arm.

Securing Unity. Unity is a quality by no means limited to exposition, although it is fundamental there. Its violation is any departure from the original subject matter or from the path of thinking along which the writer started. In our discussion it will be considered as a mistake of form merely. Failure to secure unity in thinking is digressiveness, and in expression is disrelation of sentence organization. In order to secure unity, the following suggestions are to be observed:

1. Limit a sentence to a single idea — which is to say, remember the definition of a sentence. Unrelated or loosely related ideas should not be put together in a sentence. The following sentences violate unity in this way:

He grew up and had only a grammar-school education and he also acquired the power to think, but now he is always trying to find some scheme to perpetuate motion. (The excessive use of conjunctions destroys unity; several sentences should be made, with some enlargement of material.)

He had little education and his clothes were of the style suitable to lumbermen, nevertheless he was a man of Christian principles and was determined to do right.

He is quite humorous, and I find his writing very readable.

2. In a long sentence, bring related ideas closely together. The following sentence needs recasting in order to secure unity:

The man who owns an automobile and is solely dependent upon his instruction book for location of trouble, will find himself in a sad predicament if his engine suddenly stops dead somewhere far away from civilization and having left his instruction book at home. (There is a dangling participle here as well as a loosely constructed sentence.)

3. Give each sentence a central thought and subordinate all other material to that idea. This suggestion is a remedy for several of the sentences quoted as examples under 1 and 2. It is not necessary to use simple sentences; in fact the constant use of simple sentences or simply compounded sentences produces a monotonous style. Careful subordination of thought is very important. The following sentences will gain greatly if changed into complex sentences:

Many years ago the average family grew and prepared their food, spun the flax for their wearing apparel, and in general they were independent of the rest of the world.

He had gone to the city to find himself a wife, had wooed and won her in the space of two weeks, and was taking her back over the wind-swept mountains to his cabin.

4. Observe parallelism in the expression of similar thoughts, or thoughts that bear a similar relation to the sentence. This rule will include the use of correlatives, such as *either . . . or*, *both . . . and*, *not only . . . but also*, which should be followed by words of the same part of speech; it is especially important in the use of series of items. The examples given fail to observe parallel structure:

The combined letters of Mr. Kipling are worthy of note, in regard to his powers of description, his arguments and some dialect.

All of the machine tools are in excellent condition and should tend to improve the character of courses given in machine shops both from the standpoint of the instructor and the student.

One is designed to meet the needs of the scientific man and the other for the average man.

Nothing is to be gained by discourtesy and nagging a customer.

EXERCISES FOR CHAPTER V

1. Find examples of the three types of sentences.
2. Copy the opening sentences of expository articles in a magazine, and note the variety of sentence structure.
3. Correct the following sentences:
   a. The salesman, when he sells an article, uses a convincing argument which either sells it or fails to convince his customer.
   b. A foreign language gives him this training of brain, and at the same time is useful in his work, which makes it very valuable to an engineer.

c. Then, too, the current and e.m.f. must be kept constant which is easily done.

d. The curve will show a small e.m.f. with zero current to start which was due to the residual magnetism.

e. A shunt generator will not build up without some residual magnetism present. Also if brush resistance is too great or if there is a reversal of connections in field circuit.

f. The operation of compound machines is so much more sensitive than shunt machines for the reason that when the load is applied to the both machines, it will not divide up equally, that is each will take half the load.

g. This experiment was run somewhat different than the one explained on the instruction sheets.

h. If one machine gets a little more load than the other the series field is strengthened, which increases the excitation consequently the voltage and this unbalanced action will continue until the load becomes light enough on the other machine so that its voltage raises above the other and then the load will surge back to that machine.

i. Its widespread use not only for automobiles, water and aircraft as well as for stationary uses illustrates its wide application.

j. The main building of this plant is of red brick, being about 120 feet square, 60 feet high, with only a few windows in the whole building.

k. The way to avoid all these errors is to be neat and orderly in all computations even though at first thought it seems to require more time whereas in reality the converse is true.

l. The accompanying sketch shows how a small machine is built from a shaft hanger and a few easily made forgings, which does not require much time to construct and is efficient when put into operation.

m. It is necessary to have a sound reason for every step in advance.

n. Writing these reports is an art which takes years of practice to be proficient.
o. In this way a separation is possible, the metallic compound is forced to the front, where it is caught in a box.
p. The principal points are as follows in the analysis:
q. This theme is written from notes on an article in a chemical journal about one year ago and is mostly written on the subject as I remember it.
r. It thus causes them to unite and to again form salt.
s. They are usually about eighty-five feet high and twenty feet in internal diameter at its widest part, narrowing somewhat both toward top and bottom.
t. These gases are very hot and contain enough carbon monoxide to be combustible and are utilized for heating the blast admitted through the tuyers and as fuel for other purposes.
u. A brief outline only can be given.
v. Everything is going along as smoothly as they generally do.
w. I was sent out on a job of building a three-mile road as timekeeper.
x. On the other hand French retains its early characteristics; they have coined new words but other languages have not had nearly the effect on French that they have on English.
y. Therefore his opinions and suggestions have been sought for by his employer, all of which has aided him with his employer.
z. The book is a combination of a pirate and a love story.
aa. After riding on the Nile from the first Cataract to the second, the massive temple built by Rameses II came into view.
bb. The growth of a person's mind is like a sponge.

BOOKS SUGGESTED FOR CONSULTATION

H. A. Watts: *The Composition of Technical Papers.*
T. A. Rickard: *Technical Writing.*

CHAPTER VI

PUNCTUATION MARKS, ABBREVIATIONS, AND SYMBOLS

The Importance of Punctuation. The successful organization of a sentence involves the use of marks of punctuation. A knowledge of the rules of grammar gives us the skeleton framework of a sentence; familiarity with the principles of rhetoric enables us to phrase a particular meaning effectively; and then an understanding of the marks of punctuation assists us in the best grouping of the words for clearness. The essential thought depends upon the words that are chosen, but often the clearness of the meaning is impaired or even lost by a failure to set off groups of words properly. The marks of punctuation merely assist the words to bring out the desired meaning; they should not be required to bear the burden of the clearness or the accuracy of the meaning alone. This point brings us to a definition of punctuation, as follows: Punctuation is the science and the art of using certain signs or marks in writing and in printing to aid in conveying the thought. Punctuation is the word that names the art of using the various marks of

punctuation and is, therefore, broader than the term, "marks (or signs) of punctuation." Each mark of punctuation has fairly well-defined uses developed through the experience of writers; each one contributes something to the effectiveness of written matter. In a game of chess, a player's knowledge of the possible movements of the various pieces is a necessity, but his success in the game involves his good judgment as to when to play or how far to move any certain piece. Similarly an effective writer must know the proper uses of the marks of punctuation, but even more, must have skill in choosing between them and in determining the frequency of his use of them. He must understand the assistance these signs may be to him in making clear his thought, and yet must not be too ready to employ them to offset faulty sentence organization. In summary, the functions of the marks of punctuation may be stated to be these three: (1) to make clearer the meaning of sentences; (2) to add emphasis to the meaning of the words; and (3) to aid in bringing out the movement of a sentence by showing the proper grouping of words.

The Common Uses of the Marks of Punctuation. There is little variation in the use of the marks of punctuation; the type of writing makes no difference in the rules, nor does the subject matter. The same principles of sentence structure and of rhe-

torical excellence hold in technical exposition that apply in descriptive or narrative prose. Similarly, to secure the qualities that have been chosen to characterize exposition, a writer must understand the common uses of marks of punctuation; these qualities are secured not by chance or by haphazard use, but by having every instance fit into the writer's purpose perfectly. Most of the marks have but a single or possibly a twofold use, and with the exception of the comma, colon, and semicolon there is not much room for a difference of opinion whether a given mark should or should not be used. If the context calls for a mark with a particular function, the primary determination of the existence of the need of a mark settles the question as to the kind of mark to be employed.

The marks of punctuation may be divided into terminal and internal marks. A brief mention of the marks, with an example of each, will be made, leaving fuller discussion to any standard handbook or grammar. The terminal marks are three, corresponding to the possible emotional attitudes in expression of thought; the *period*, denoting an assertive attitude; the *question mark*, denoting an inquisitive or a doubtful attitude; and the *exclamation point*, denoting an intense feeling, such as surprise, wonder, anger, etc. Every sentence has a terminal mark of one kind or another; that is involved in the very construction of a sentence.

The use of a period is illustrated by this or by the preceding sentence, in which a plain assertion is made. The use of a question mark is illustrated in the following sentence expressing a request for information:

How will the business situation affect you?

The question mark has an internal use also, even in the sense just mentioned, but more frequently to express doubt or uncertainty as to the fact stated, as for example:

Roger Bacon (1214?–1294) was the first Englishman to write from the modern scientific viewpoint.

In this usage the question mark is sometimes inclosed in parentheses, particularly if any sarcasm is intended. The use of an exclamation point is illustrated by the following:

He had a beautifully executed set of plans for a perpetual-motion machine. And he really thought it would work!

The internal marks of punctuation are: the *comma*, denoting a brief pause; the *semicolon*, denoting an intermediate pause; the *colon*, denoting a long pause; the *dash*, denoting an interruption or unexpected turn of thought, used sometimes at the end of an unfinished sentence; the *hyphen*, denoting the compounding of syllables in a word or of words used together; the *apostrophe*, denoting the possessive case or the omission of letters in

contractions; the *parentheses*, denoting matter that is interpretative or subordinate; the *brackets*, denoting interpolated matter; and *quotation marks*, denoting conversation or matter taken over from some other writer.

The three marks that show pause give the writer the greatest difficulty, for the opinions of people may honestly differ about the necessity for a pause, or granting that, about the length of the pause. From this point of view of pause, the uses of the comma may be explained under the following heads: (1) The brief pause between the parts of a compound sentence, as, for example:

> A merchant may advertise his wares, a manufacturer his product, but reasonable modesty and his code of ethics prevent a professional man from advertising his skill. (Harrington in *The Value of English to the Technical Man.*)

(2) The brief pause between words in a series, all in the same grammatical relationship, as, for example:

> Evidently he [the engineer] must have a large acquaintance with such sciences as surveying, physics, chemistry, geology, metallurgy, electricity, applied mechanics, kinematics, machine design, power generation and transmission, structural designing, and land and water transportation. (Johnson in *Two Kinds of Education for Engineers.*)

(3) The brief pause between words or expressions that are in the appositive construction, as, for example:

Columbus, the discoverer of America, was deeply interested in the other scientific problems of his day.

(4) The brief pause that precedes and sometimes also follows explanatory or supplementary matter of the nonrestrictive kind, as, for example:

This, of course, is well known.

Breadth of knowledge, upon which sound judgment must rest, can be attained only by broad training.

"But why," asks the practical man, "must a student learn modern languages?"

(5) The brief pause necessary to group words correctly, as, for example:

As she was going the same way he was, on her way to work, they often got on the same car.

From the same point of view of pause, the semicolon duplicates some of the uses of the comma, but with a sharper emphasis, indicating a somewhat longer pause. The uses may be stated thus: (1) The pause between co-ordinate sentence elements when there is a distinct grammatical separation or thought contrast, as, for example:

This suggestion has since been verified; so that now the whole theory of light is nothing but a branch of the great science of electricity. (Ranum in *The Relation of Mathematics to Engineering.*)

(2) The pause between items in a series when long phrases or clauses are used, as, for example:

Try to find a chum who is in another department; go to literary societies; haunt the library; attend the available lectures in literature, science, and art; attend the meetings of the Science Club; and in every way possible, with a peep here and a word there, improve to the utmost these marvelous opportunities which will never come to you again. (From J. B. Johnson's *Two Kinds of Education for Engineers.*)

The pause indicated by a colon is still longer, or if not longer precedes sentence elements that are more sharply set off in thought relationship than those mentioned under the semicolon. The uses of the colon are three: (1) As a mark of expectation, preceding a list or a statement that has been led up to, as, for example, the sentence given under the use of the semicolon, and the following:

Students in the course in civil engineering are given an opportunity of specializing to a certain extent, in three general lines of work, through the electives offered in the senior year. These lines of work are: structural engineering, railroad engineering, and municipal engineering. The subjects that come under the latter head are: sanitary, water supply, and highway engineering.

(2) As an intermediate pause uniting main clauses, as, for example:

The boy is coming home: he will arrive at three o'clock.
I went to see the picture: it was not what I expected.
Again he had tried; again he had failed: his last chance was gone; he was lost.

Of the other internal marks of punctuation, the uses are fairly familiar. Without any discussion, the following examples will show the correct usage:

Dash: These problems—and thus the educational preparation required to cope with them—are practically the same in all walks of life.

Hyphen: A two-year course. Bread-and-butter education.

Apostrophe: 'Tis no small point to its credit that it won. Fourier's series. Maxwell's theory.

Parentheses: Sliding gates (Fig. 3) are raised and lowered. At the maximum reading (0.41 ampere) the leakage was approximately 0.06 per cent on the entire system.

Brackets: See example under use (2) of the comma, p. 73.

Quotation marks: There are other men who will say of their chief, "He is the best man I ever worked under."

This is a "safety first" precaution.

In addition to the regular uses there are a few special uses which we should examine.

Special Uses in Technical Writing. As already remarked, the signs of punctuation have no different use in technical writing from their use in other types of writing; but there is probably a greater frequency of the use of the colon, the hyphen, and the period in abbreviations.

This frequency constitutes practically special usage. The *colon* is a mark of anticipation or expectancy and is used before a list or series of items. Technical writing is very likely to have such lists, perhaps giving the divisions of a class, or parts of a whole, or factors in a situation. The two following sentences illustrate this use and indicate the frequency with which the colon may be found in technical writing:

Engineering covers such a large field that it is divided into many classes, the main classes being: civil, mining, mechanical, electrical, and chemical.

The definition of the word engineer is divided into four parts: first, one who is skilled in the principles or practice of any branch of mechanical science; second, one who has charge of, or manages, an engine or locomotive; third, one of an army corps which builds bridges, roads, etc., for military use; fourth, one who carries through a scheme or enterprise.

Another use of the colon frequently found in technical writing is its employment in stating references, a use found, of course, in literature as well, for example, in giving Scripture references, as Matt. 7:12 (the Golden Rule). The colon separates the larger from the smaller division—chapter from verse, volume from page, paragraph from line, act from scene, hour from minute. Examples of such use are:

McClure's Magazine XXXIII:72. King Lear I: 1:33.

7:15 A. M.

The use of the hyphen in compound words has already been discussed (p. 48). It indicates a certain close association of ideas expressed by two words used together, the meaning differing from that of the words used separately. The two words are not, however, so closely associated that they are written solid as one word. The omission of the hyphen would affect the meaning, changing the first of the two words to a plain adjective, modifying

the second. A use still more distinctive of technical writing is the use in compound technical adjectives; that is, with two words used together as an adjective in a technical sense. The words so used may ordinarily be nouns, but in this combination have the force of a single adjective. Not infrequently two or more pairs of such adjectives are used with a noun. The following examples are taken from a list of equipment:

gas-heated furnaces.
125-horsepower Westinghouse generator.
16-horsepower Burke 230-volt shunt motor.
a General Electric 3-phase, 220-volt, 60-cycle alternator.
a 40-horsepower gasoline automobile engine of the four-cylinder, single-acting, four-cycle, water-cooled type.

Almost every page of a technical journal will show instances of the hyphen in compound adjectives. The following detached sentences are examples:

Before the new power plant was built, power requirements of the Hershey properties were supplied by a steam-engine-driven plant, operating in conjunction with a Diesel-engine installation.

Where natural draught is used, the boiler-room basement is an empty space.

There are a few instances of cast-iron economizers failing under high-pressure tests, and it is now recommended by manufacturers that preliminary tests be kept well within the elastic limit of the economizer material.

The other mark of punctuation that is used extensively rather than differently in technical writing

is the period in abbreviations. Before discussing this in detail, we should note that contractions are distinguished from abbreviations in that an apostrophe rather than a period is used to show that the expression is a shortened form. In either, one or more letters, usually including a vowel, has been omitted for the purpose of reducing the number of syllables. The following are common forms of contractions:

I'm for I am.	I've for I have.
can't for cannot.	o'clock for of the clock.
ne'er for never.	rec'd for received.

Contractions are not to be used in formal writing, with a few exceptions like *o'clock*, which has established itself; some are used in poetry for the sake of metrical needs, and they are frequent in colloquial writing.

Punctuation in Headings. In posters, display advertisements, legends on drawings, title-pages, and headings, the marks of punctuation are usually omitted, except periods, apostrophes, and quotation marks. The purposes usually secured by marks of punctuation are here accomplished by word grouping into lines and by spacing. Two considerations determine the grouping: (1) the thought to be brought out, care being exercised that each line stand more or less as a unit in the phrasing; and (2) the quality of neatness of arrangement, an

attempt being made to have a symmetrical or balanced form. The title-page of almost any book, this one, for example, will furnish a case of arrangement by grouping which omits marks of punctuation which would be necessary under straight prose conditions. The following legend from a map will illustrate the omission of commas that would be necessary if written in straight prose:

TOPOGRAPHICAL MAP
OF
J. J. WHITACRE PROPERTY
WAYNESBURG OHIO.
DEPARTMENT OF CIVIL ENGINEERING
CASE SCHOOL OF APPLIED SCIENCE
CLEVELAND, OHIO.
FEBRUARY 26 1921
Scale 1"–400'

Examples of display advertisements may be found in any issue of a technical magazine.

The Use of Abbreviations. An abbreviation is a shortened form of a word, the letters preserved being written consecutively in order, without an apostrophe, but with a period. The omitted letters may be a block anywhere following the initial letter, or may be separate or scattered letters or groups of letters. The tendency to use abbreviations in technical writing is increasing. The main objection to the use of abbreviations, however, is

not their increasing number, but rather the lack of uniformity or standard in their use. Each writer is more or less a law unto himself. Many textbooks that employ numerous abbreviations have to print a key for those used, because, either in range or in form, the book does not keep to established usage, such as would be found in a dictionary list. And when we realize the extent to which a single abbreviation may be used, we understand the confusion likely to result without a key. For instance, the single letter "m," both capital and small letter, is listed in the dictionary as the proper abbreviation for any one of forty-eight different words. This fact simply means that any writer may use any abbreviation he pleases; there are no rules. Dictionary lists are merely compendiums of individual usage. It is true that the context of an abbreviation will eliminate a large percentage of the possibilities, but there is still confusion and lack of uniformity in the practice of writers. An example of the excessive and unauthorized employment of abbreviations, used simply in an attempt to save space, is the following, taken from the classified advertisements of a daily newspaper:

FOR RENT—Beaut. furn. lt. hskpg. rms.; priv. fam.; mod. conv., elec. lts., h.w. ht. Reas.

Such an example defeats the real purpose of abbreviations, which is to save not merely space and

thereby expense, but also the time of the reader; this specimen becomes a puzzle rather than an advertisement. Yet usage sanctions many extreme forms devised by fertile imaginations. Books of reference have done something toward standardizing abbreviations, but there is no real way to speak with authority for all classes of writers. The Post Office Department has prescribed the accepted abbreviations for state names, etc., but is as frequently not followed as followed in the case of certain of them, where the popular desire for short forms prevails, for example, in the use of O. for Ohio.

There are no rules for the construction of abbreviations, any more than for their use. For instance note the following common abbreviations, each one illustrating a different plan in the omission of letters:

coll. for college.	Thos. for Thomas.
bldg. for building.	N. Y. for New York.

Suggested Rules for Standardization of Abbreviations. The national engineering societies, realizing the disadvantage of a lack of standardization, in 1910 appointed members of a joint committee to devise some standard rules. The committee met and formulated fourteen rules. To most of these approval and adoption have been accorded, to others, especially to some recommended forms,

sharp exception has been taken. Widespread habits are hard to overcome. An attempt is here made to suggest rules, based in part upon the rules of the joint committee referred to, to apply to the use of abbreviations in technical prose. It is understood that no objection would be made to some difference in practice in titles, legends, headings, advertisements, formulas, etc.

1. Use a period after each abbreviation. The abbreviation may be a single expression and must be distinguished from a contracted form with an apostrophe. It may be a form compounded by means of a hyphen, in which case only one period is used after both forms, the hyphen being considered to make a single expression of the combination. Some words formerly written separately, but now commonly as one word, will be discussed in the next paragraph. Abbreviated forms have clung to the original method of writing the words. Examples are:

i. h. p., indicated horsepower.
sq. ft., square feet.
F. R. S., Fellow of the Royal Society.
kw-hr., kilowatt-hour.

2. Use small letters for abbreviations, except for proper nouns. Capitals are unnecessary for common nouns, although frequently used. If an expression has some common and some proper nouns,

there is no reason in writing all initials the same way. The following are correct·

B. t. u., British thermal unit.
U. S. gal., United States gallon.
a. c., alternating current.
d. c., direct current.
a. m., morning (ante meridiem).
p. m., afternoon (post meridiem).

3. Use all abbreviations in the singular. The chief reason for this rule is to avoid two forms of an abbreviation for essentially the same word. The context will easily determine the reading of the abbreviation; there is now no confusion in telling whether ft. or min. is singular or plural. Apply this usage consistently, as the following will show.

15 in. 10 oz. 5 gal. 2 bbl. 30 cc.

There are a few special forms of the plural, relics of Latin influence:

ff. for following.
pp. for pages.
FF. for Brethren (Fratres).
ll. for lines.
LL. for Laws (in degrees).

4. Do not abbreviate abstract or descriptive words. Such words generally are very important in restricting the scope of the noun with which they are used, and if abbreviated to a single letter may be misunderstood easily. There are, however, certain exceptions that have established themselves by usage, *viz.:*

i. h. p. for indicated horsepower.
e. m. f. for electromotive force.
e. h. p. for electric horsepower.
b. h. p. for brake horsepower.
m. m. f. for magnetomotive force.

Other expressions, such as the following, should not be abbreviated: boiler horsepower, high-pressure cylinder.

5. When numerals are used with nouns of measure or other designation, the noun may be abbreviated, but not otherwise. The following differences will be clear:

capacity of 25 hp., but the horsepower is 25.
Fig. 2, but illustrated by 10 figures.
30 lb., but several pounds.

6. Avoid the use of an abbreviation at the end of a sentence, and particularly at the end of a paragraph. This cannot always be done conveniently, an abbreviation like *etc.* frequently concluding a list and coming at the end of a sentence. If an abbreviation does come at the end of a sentence, the period denoting the abbreviation will do double duty as the sentence stop also. The avoidance of such double duty is the reason for the rule. Write out words that come at the end of a sentence even though elsewhere they would be abbreviated—*e. g.:*

. . . at a pressure of 30 lb. per square inch.

7. Use decimals so far as possible in place of fractions. The indeterminate fractions may best

be expressed in fractional form, rather than to string out decimal places; but the decimal form is to be preferred. The following will illustrate:

1.25, 2.5, but 3⅛, 1⅞.

Either kind may be written on a typewriter, though the decimal form is more compact and easier to read.

8. In all decimal numbers having no units, put a cipher before the decimal point. This rule prevents unintentional omission. Examples are:

0.15. $0.67.

9. Use words in place of characters or symbols, especially when such signs are used for several meanings. This rule is aimed to prevent misinterpretation of the sign; a sign will stand for one meaning and only one. For example, write:

12 by 20 ft. (do not use x for "by").
5 min. 12 sec. (not 5′ 12″) this is when periods of time are meant.
25 ft. 4 in. (not 25′ 4″).
But 17° 19′ 42″ is correct, indicating degrees of circular measurement, such as latitude or longitude.

10. Follow usage in abbreviations of firm names. If you do not know the firm's usage, do not abbreviate. For example, the following are the ways the firms themselves abbreviate their names, some with the ampersand and some without:

Clemson Bros., Inc.
Bauer and Black.
R. Wallace & Sons Mfg. Co.
The A. C. Gilbert Co.

Changes of Form. In several instances there have been changes of usage in abbreviations; there are likely to be more. For example, the word horsepower was commonly abbreviated to h.p., now it is usually hp., or the symbol HP. The word was formerly written as two separate words, then with a hyphen between the two words, and now commonly as one word. This evolution accounts for the changes in the form of the abbreviation. But oddly enough, the word "railroad" does not show a parallel development in the abbreviation, although it does in the compounding of the word itself. The accepted form of the abbreviation is still R.R., of course, usually written with capitals in the name of a particular railroad; but the word is a single word always. The word "candlepower" has undergone a change similar to that in the word horsepower. Changes in the official abbreviations of some of the states have been made, the most recent one being the adoption of Calif. instead of Cal. for California. There is disagreement whether some words should ever be abbreviated; for example, the short words, mile, month, ohm, ton, volt, watt, and year, and the names of these states: Idaho, Iowa, Maine, Ohio, and Utah. The best opinion is against abbreviations of any of these words. In the case of some other words there is disagreement over the form of the abbreviation, although such disagreement is gradually being overcome. In deciding

questions that arise over abbreviations, either their form or their use, one must go back to the primary interpretation of the function of abbreviations, which is economy of space together with convenience to the reader. The gain in space over a four- or five-letter word is not usually sufficient to warrant the abbreviation; or to put the matter in another way, the repeated use of a single letter or of two letters as an abbreviation for several different expressions is so confusing as to warrant a decision against such use. The convenience of abbreviations in handling routine or statistical matter, where of necessity the principal words must be often repeated, is obvious, but when the convenience of the writer overshadows that of the reader, it is time to cease using abbreviations.

The Use of Symbols. A symbol is a letter or combination of letters, a sign, or a character, which represents a word or a thought. In one sense, numbers are symbols; the letters in algebra, standing for numbers, are certainly symbols. A symbol may be an abbreviation. The purpose is the same as that of abbreviations, but the field of their use is more commonly confined to formulas, examples, or diagrams. Examples of symbols are:

C for carbon, and similarly the designations of the other chemical elements, written without a period.

$ for dollars.

% for per cent.

¶ for paragraph.
Plus, minus, multiplication, and division signs.
¢ for cent.
$\sqrt{\ }$ for the root of a number.

Technical writing employs a great number of such symbols, especially textbooks in mathematics, chemistry, mechanics, or electricity. Almost every department of activity has its set of symbols or signs—*e. g.*, music, drawing, architecture, medicine, and finance. A student in any subject has to become familiar with the common symbols used; a reader in a subject will usually find a key to the use of the symbols printed in the textbooks of the subject. It is an interesting study to trace the reason for the origin or for the form of the symbols employed. The common use of the typewriter is another reason against using symbols, particularly unusual ones, and also superscripts and subscripts as variations of symbols. Exponents are, however, unavoidable in mathematics and mechanics. For the same reason the use of the Greek alphabet is undesirable.

A branch of work closely related to the writing of English is that of typesetting; its set of symbols ought to be familiar to every person who will ever have anything to do with the preparation of copy for the printer. The use of these symbols will be discussed in the next paragraph.

The Correction of Proof. Typesetting used to

be done entirely by hand; now it is done by the linotype machine in all big establishments, where speed is a requisite. The hand work offers more opportunities for error than the machine work. The correction of errors, however, can be made more economically and more specifically in hand than in machine work, because each error can be reached by itself in hand work, but only in lines in machine work. After the copy is first set up, an impression of the type is taken on rough paper. This is called the galley proof, because the type is placed in a long frame, known as a galley, which does not indicate the column lengths at all. An editor and, frequently, the author goes over this galley proof, and indicates by symbols the corrections to be made. The compositor makes these corrections and takes another proof; when correct, the type is transferred from the galley to the column or page forms. The following are the symbols used for marking the common errors:

δ The small Greek letter delta, the initial letter of the Greek verb, imperative, dele, meaning: take out, omit.

Insert a space.

⁀ Take out a space, draw together.

[ ] Draw over to the left or the right for alignment.

⌐ Raise a type.

⌙ Lower a type.

9 Put a type right side up.

l. c. Use lower case, or small letter.

caps. Use large capital letters; also indicated by three lines underscored.

s. c. Use small capital letters; also indicated by two lines underscored.

ital. Use italics; also indicated by a single line underscored.

w. f. Change type to another style or font to make it like the rest.

? Questions the truth or the correctness of the copy.

EXERCISES FOR CHAPTER VI

1. Clip from a newspaper an example of each mark of punctuation; test its correctness.
2. Write original sentences to illustrate the uses of the marks of punctuation.
3. In an article in a magazine mark all instances of the use of the colon; what is the particular function of each use?
4. Mark all abbreviations used in an article in a magazine; are they the usual forms of abbreviation of the terms?
5. Illustrate each of the rules given in the text with other examples.
6. Find examples of abbreviations in advertisements.
7. Note any textbook that you have that has a key to its own abbreviations, and compare the list with that in the dictionary.
8. Make a list of the symbols that you have to use in your other studies.
9. Secure some galley proof from a printer and correct it, using the signs intended for proof reading.
10. Make a list of the instances of the compound technical adjectives with hyphens, found in a magazine article.
11. Criticize the following sentences for punctuation:
    a. Mr. Barrie's style of writing is good, it is not tedious.
    b. In grading the instructor takes into consideration three factors, the manner of approaching the apparatus, the form shown in performing the exercise, and the manner of dismounting.
    c. It consists of apparatus work, on the horses, bucks, rings and bars.

d. In a college like ours editorials like the one in last weeks issue on the problems ahead are very good.
e. I therefore recommend that the following system be instituted: First, that every student from each class should be thoroughly examined at the beginning and end of each term, second that exercises should be prescribed to suit the needs of the student, and third that more basketball games should be played in order that each student become more actively interested in the sport and thereby help to furnish material for the varsity.
f. Although these men have all left those who remain still have the reputation which these men helped to make to live down.
g. The two methods of exposition namely definition and analysis were studied.
h. Examples of modern languages are French, German, Spanish, English etc.
i. Another bad phase is the impression it conveys to new men in school; suppose a new man should read this burlesque on college life, it would at once impress him unfavorably.
j. The "Journal of the American Institute of Electrical Engineering" is from the students viewpoint one of the best periodicals in the school library.
k. The stamps are grouped in sets of odd numbers, either three five or even more making a unit.
l. From this point of view there are three substances to be considered; the surface the priming and the pigments.

BOOKS SUGGESTED FOR CONSULTATION

H. Frost: *Good Engineering Literature.*
W. O. Shepherd: *Handbook of English for Engineers.*

CHAPTER VII

THE METHODS OF ANALYZING WRITTEN MATERIAL

Analysis as a Method of Exposition. The two methods of exposition were stated to be definition and analysis. We have now followed the application of definition to the meanings of words, the historical influences of our language, and the forms of expansion in our vocabulary; we have also seen how important the proper organization of a sentence is to secure the essential qualities of expository writing, and how the effectiveness of sentences often depends upon the use of marks of punctuation and abbreviations. Now we turn to the second great method of exposition, known as analysis. A formal definition of analysis is: the art of separating a whole into its component parts on the basis of the working principles involved. Literally, it means a "loosening up," the opposite of synthesis, which is a "putting together." The word is used in many subjects—*e. g.*, chemistry and mathematics; when applied to literature it is the careful examination of the written material to find the way in which

the thought is built up. A study of the methods of analysis should give us greater ability in the use of the methods of synthesis; that is, we may learn how to write by examining the writing of others. This chapter will take up the various methods of analysis, concluding with some principles for the organization of thought in one's own writing.

The Kinds of Written Material to be Studied. Before we attempt to apply the principles and methods of analysis, we may first ask, what kind of writing is the scientist called upon to do? We recognize, of course, that he *may* do any kind, including verse or novels, such as F. Hopkinson Smith and Dr. S. Weir Mitchell, both eminent scientists, wrote. But we shall limit ourselves to those forms of writing that are naturally associated with the professional work of a technical man, especially an engineer. The answer to our question will then include: business letters, routine reports, special reports, specifications, news items for daily newspapers or trade journals, reviews of books or of addresses, advertisements, editorials, articles for magazines, essays, addresses, and books. Practically all of these are examples of expository writing, or embody the principles of exposition. We shall group them in the later chapters for discussion in detail, after we study here the forms of analyzing what others have written. In this way we shall

learn how others have organized their material and presented it to readers.

The names given to the methods of analyzing the thought of others that has been put into writing are: translation, paraphrase, summary, review, outline, and brief. In using any of these we are trying to state in our own words what somebody else has written, and maybe to comment upon it. We wish primarily to set forth the thought of another person with an explanation of it. We will take up each method in order, with examples.

The Translation. Translation almost always involves the use of a second language, although the dictionary meaning allows two distinct styles or types of a single language in speaking of the method. With the former meaning in mind, translation may be dismissed rather briefly here. It may be noted, however, that to translate a passage from one language into another requires a knowledge of the two tongues. The knowledge of one may be very limited, as is usually the case with a student in school. The extent of the vocabulary grows with the repeated efforts at translation; in fact, the size of the vocabulary in each tongue grows with the study. When the translation is from some other language into English, the ability to use clear and accurate, and at the same time idiomatic English is taxed in a very healthful way. Most student translations are too literal and too stiff or formal.

The aim should be to employ the very best English possible to convey the thought of the original. Here, then, is excellent training in those fundamental qualities of exposition that we have discussed in a previous chapter. Here, also, is an argument for the knowledge of some other language than one's native tongue; such knowledge helps us to know our own language better, and from an angle that we can get in no other way. The task of translating is, however, the task of another department than the Department of English, and so we will not discuss its methods further.

The Paraphrase. Paraphrasing has been used rather seldom in modern days, but it has splendid advantages as a means of training in language construction. The word means an alternative statement, the saying of a thought in parallel words. It is an attempted explanation of an idea with an avoidance of the words of the original. Inasmuch as it is an explanation it comes clearly under the process of exposition. The most common use of the paraphrase is the rendering of a thought expressed in poetic form, into a prose form, which by avoiding rhyme and meter can adopt the normal sentence order and a simple vocabulary. Paraphrasing is not limited to the changing of poetry into equivalent prose; it may be applied to rendering a scientific, technical writing into a nontechnical, popular account, a philosophical work into

a simple style, or an abstract into a concrete discussion. The grammatical constructions of the original need not be preserved—complex sentences may be broken up into simple participles, and adjectives may become phrases or clauses, and infinitives may be made over into indicative verbs. There are, however, two main points that should be observed in paraphrasing: (1) the paraphrase must be a real explanation of the thought of the original; and (2) the paraphrase must catch as nearly as possible the point of view and the spirit of the original.

The Summary. Summarizing in a most useful form of analysis. As its name implies, it is a process of giving the substance but not the details of the thought of a piece of writing or address. It is essentially a condensation of thought. It should, however, keep close to the original in both the quality and the sequence of the thought. Negatively stated, the summary is never a mere table of contents, or a statement of the personal opinions of the summarizer. Essential points to be observed are these: (1) the summary must give the central idea of the original, omitting all appositional material, and must convey the main thought truthfully; (2) the summary must preserve the proportions of the original, subordinating all its secondary elements, if they are given at all. A summary does not go into causes or reasons, but rather states results and conclusions. The summary is also

called a *précis* (a French word), or an abstract, or a *résumé*. An account in a morning paper of a lecture, in so far as it tells what the lecturer said, is an example of a summary. A better example, because it avoids the journalistic style, which will be discussed in Chapter X, is the following paragraph from the *Scientific American Monthly* for May 1921, condensing an article that appeared in another magazine:

DISCOLORATION OF METAL

The Houghton *Industrial Digest* for February discusses sunlight as the cause of discoloration of polished metal parts. An inquirer states that three years ago a new mill was erected and equipped with expensive machinery and special pride was taken in keeping bright parts polished and free from rust. They were polished with waste and rubbed with lubricant oil, but after a time took on a brownish color which, while it did not resemble rust, could not be removed. Examination of the machinery showed that most of the discoloration was to be found upon metal parts exposed directly to the light, and where direct rays of the sun could strike the metal the spots were darkest. Bright parts in semi or complete darkness were unaffected and the conclusion is inevitable that the brown coloration in question is due to the action of the sunlight on the lubricant oils used in the effort to prevent rust. It is probable that the action of light upon these hydrocarbons caused a deposition of carbon and a great liberation of carbon. It is also well known that various metals have affinity for carbon so that if the hydrocarbon is affected by the light the carbon deposits in the pores of the metal give a brownish stain.

The Review. The review does what the summary should not do—convey the opinions of the writer.

It may, and usually does, include a summary, but it goes on to add comment. Under any conditions it must give the meaning of the writer of the original and make it quite clear to the reader. An interpretation logically precedes a criticism and, therefore, the position of the author of the original is first stated and then discussed. Underlying the review is first a careful analysis of the thought and a digest of the whole material. A person cannot comment intelligently upon some book or article with whose contents he is not familiar at first hand. The thought must go through the medium of his own mind and personality. The comment he makes may be favorable or unfavorable—the word review, and also the word criticism, in their true use are nonpartisan, or, better, are simply interpretative. What has been said about the personality of the reviewer suggests another point—that there is an inevitable standard of evaluation either expressed or implied in every review, that involves the qualifications and the purpose of the reviewer. A person is qualified by temperament and by experience to review some kinds of writing better than he is others. The value of a review then depends to no small extent upon the qualifications of the reviewer, a matter which ought to be known at least approximately.

Reviews are not limited in range of subject; they may be of projects, books, lectures, personalities,

events, experiences, etc. The preparation of reviews is excellent training for one's interpretative and critical faculties, and also for one's standard of values in the subject at hand.

Good examples of short book reviews are given here, both clipped from the *Cleveland Plain Dealer:*

A valuable work, the last book from the pen of the late James C. Fernald, author of many volumes of enduring value, associate editor of the Standard dictionary, is *Historic English*, a résumé of the history of the English people as seen in the development of their language. Carefully selected masterpieces of English literature are given in the volume, choice specimens that illustrate the progress of both people and language. It is stated that Dr. Fernald took a very deep interest in this work, giving to it fully the same care and study and perfection of construction that his earlier volumes received, and making it a fitting climax to his long and notable literary career.—Funk & Wagnalls Co., New York.

An unusually comprehensive work is *The Master Letter Writer*, which includes in its contents 500 model business letters, the author being E. B. Davison, familiarly known as "Ad-Man Davison." Ad-Man Davison has evolved what he calls "the new science of successful letter-writing," and his book has asserted its value by promptly demanding a second edition. Mr. Davison is thorough in his teachings and happy in his illustrations, and his forms are direct and easily understood.—Opportunity Press, New York.

Note the difference in the treatment from that found in the summary on page 98. The opinion of the reviewer is expressed, in both of these cases, favorably. Literature is, of course, filled with excellent reviews; for example, Macaulay's essays

are in form book reviews; several of Stevenson's essays are reviews of current movements or ideas.

The Outline. An outline is a topical, as distinguished from a literary, analysis of a piece of writing or an address, giving the development of the thought as in the original. The order of the original is followed, and a distinction is made between principal and subordinate ideas. Outlines are usually divided into two kinds: (1) topical or formal; and (2) running or fragmentary. The latter is but a series of jotted notes, or rough catch phrases, to suggest the course of thought in the original. In the formal outline a plan of arrangement is adopted whereby the main co-ordinate points are indicated as such by their relative position on the sheet of paper, and usually also by a system of symbols. A system of symbols uniform for all work is very desirable in college study, both from the standpoint of the teacher and from that of the student. One that is gaining favor for its simple clearness alternates numerals and letters, using Roman numerals for the main topics and capital letters for the chief subordinate points. Further division is shown by the use of Arabic numerals, then small letters, then Arabic numerals in parentheses, and then small letters in parentheses. Probably that is as far as anyone would care to go in an analysis, but there are, of course, the letters of the Greek alphabet, or the

letters of the English alphabet in reverse order still possible. Headings with the same thought value, or the same logical relation to the preceding point, are indented the same distance from the left-hand margin, and are given symbols of the same form in progressive order. A specimen outline will appear thus:

MY YEAR IN A COAL MINE

I. Coal Mining.
  A. Types of Mines.
    1. Deep Shaft.
    2. Shallow Hillside.
  B. The Mine I Was In.
II. Reasons for My Work.
  A. Interest in Coal Extraction.
  B. Remuneration.
  C. Steady Work.
III. Experiences.
  A. The First Day.
  B. Blasting.
  C. A Cave-in.
    1. Cause.
    2. Results.
  D. The Crazy Mule.
IV. Results.
  A. Acquaintance with Working Men.
  B. Money Saved.
  C. Sympathy for All Miners.
  D. Appreciation of Outdoor Life.

The phrases used in the outline are commonly topical words or phrases—not full sentences. It is seldom that an outline means so much to a person

who has not read the written-out form as it does to one who has, or so much to any other person as it does to the one who made it. It is primarily an individual analysis. Two or more persons outlining the same original material would seldom agree in their analysis of what are the principal and what are the subordinate points, or at least in their indication of their interrelation, or in their phraseology. In any case, however, the original is set forth in skeleton form according to some one's interpretation. Outlining has great benefits in the cultivation of discrimination and logical reasoning.

The Brief. A brief differs from an outline in two particulars, although it is usually classed as an outline. One difference is that its form always shows complete grammatical sentences for every heading, with an interlinking word, usually *for*, between superior and inferior points to bring out the essential subordination of thought. A brief is a guide to the thought relations, or to the logic of the sequence of the ideas. When an assertion is made, the supporting reason immediately follows, and if that in turn depends upon several items of evidence, it, too, must be linked in form to the several items arranged in subordinate position, with symbols appropriate to the whole scheme of the brief. The brief is used in argumentative work —*e. g.*, formal debates, court trials, legal adjustments—in short, wherever there is evidence sub-

mitted in support of a contention or opposed to a contrary assertion. Very frequently, and properly, the subdividing of a brief is carried to the citation of an authority, or to the stating of a concrete fact, such as quoting figures, perhaps indented four or five places in the scheme adopted.

The second point of difference between a brief and an outline is that the brief is—or should be—entirely intelligible to anyone reading it, whether that one had any previous familiarity with the subject matter or not. An outline is clear to its author and only suggestive to anyone else; a brief is clear to anyone that can follow the thread of an argument. Legal briefs are used by lawyers in presenting their cases in courts, and are submitted to the judge, and sometimes to the opposing counsel, as a record of the line of attack and appeal, and of the evidence presented to substantiate the claims. Not infrequently the briefs are submitted without oral presentation of the case.

Preparing for One's Own Writing. Of the methods of analysis explained above, that of outlining will prove most immediately helpful in preparing to write one's own material. The importance of organizing material for spoken discourse will be discussed in the next chapter; the importance for written work will be pointed out here. There are two main purposes for preparing an outline: (1) to clarify one's thought on the subject; and

(2) to secure a proper relationship of ideas. It is a matter of common experience that one is surprised at his own ignorance of a subject when, and not until, he begins to investigate the available material. One's opinions are made up on the basis of very flimsy evidence, and often the stronger the opinion the more insecure is its basis. In order to tell others about a subject it is obvious that one should have more than unsupported opinions to present. The best preparation of material, then, is to reduce to an outline the evidence available in support of one's thoughts. The most immediate benefit is upon the form of the thoughts in the mind of the writer. Putting down on paper what he thinks of a subject makes one formulate his ideas carefully. He is more likely to be free from the fault of extravagance of statement; ideas take a more serious look when down in black and white for others to read. If they stand at all they must represent clear thinking. Making an outline, then, helps to clarify one's thought.

The second purpose—that of securing a right relationship of ideas—is likewise significant. When we look at a subject from many sides and consider the elaboration of ideas in a systematic fashion, we will strive to give a good balance to the whole plan. One point overshadowing the others, or inconsistent with any others, will destroy or at least impair the effectiveness of one's position.

With all the points on paper before us, any disproportionate treatment or contradictory relationship will be more evident. Judgment of the effectiveness of a written discourse will, therefore, be far better developed if one prepares an outline of what one wishes to say.

The Question of Order. The analysis of a piece of writing or the preparation of an outline of original material inevitably raises the question of the order of the topics discussed. The question is the same whether the material is a single paragraph or a long book. The methods of developing a composition, however, are varied, and must depend upon the nature of the subject matter for final determination. Suppose we select four types of subjects as follows: processes, objects, organizations, and abstract ideas; the order of procedure in developing these subjects will illustrate the importance of finding the most effective method. An exposition of a process may best follow an order of time, because the fundamental idea of a process is that of sequence of steps or events. A manufacturing process naturally starts with the raw materials used, their source, their qualities, the methods of handling them, etc.; then it presents the successive steps in the manufacturing itself, and concludes with the description of the finished product and its uses. An exposition of an object, such as a machine, follows an order of logical

enumeration or comparison, developing the details until the function of each part is explained in the light of the function of the whole. This is a building-up process, proceeding from the familiar and the simple to the unfamiliar and the complex. An exposition of a movement or an organization follows a method which is a combination of the two just mentioned—the order of time and the order of development. The background or source is first explained, and then the objects and purposes, with the details of the workings, are presented. An exposition of an abstract idea, such as the theory of light, follows a method of definition, as discussed in Chapter II. Some concrete instances or examples, some accepted facts, or some personal observations will make a suitable starting place; the submission of proofs to substantiate the theory will follow; and then some applications to the conditions of life will conclude the discussion.

These instances will serve to illustrate the methods. No exhaustive list can be given, because the order of development to be followed depends upon the nature of the subject matter, and also upon the audience to be reached. The good judgment of the writer will decide what is appropriate.

Paragraphing. A paragraph is a unit of discourse that develops a single topic. A sentence may state an idea; a paragraph develops it. Sometimes a whole composition is compressed into a

paragraph, examples of which may be found in the editorial comments, news items, brief write-ups for advertising purposes, short reviews of books, biographical notices, etc., in magazines. More often a paragraph is a part of a composition, one of many related paragraphs. The relationship of any paragraph to the whole composition, or perhaps better to the immediately adjacent paragraphs, must be determined with care. The use of a topic sentence, usually at the beginning of the paragraph, but sometimes led up to by the discussion, is a great aid in securing effective paragraph construction. These matters are really a part of the study of rhetoric; we are concerned chiefly with the broad functions of the paragraph, which may be summarized thus: (1) to assist in analyzing the thought, especially when a long or involved subject is being discussed; (2) to make clear the thought by showing breaks in the continuity, changes of person in conversation, or the sequence of serial items; and (3) to aid the reader by relieving both physical and mental strain in reading consecutively. It is a fairly modern device whose value is quickly recognized.

The Importance of the Opening Sentence. One other point remains in the discussion of preparing material for publication: the importance of getting a good start. If sentence structure is difficult—and we find that it is one of the greatest sources

of mistakes—the opening sentence is particularly so, because it determines the first impression in the mind of the reader of the degree of interest the subject matter holds for him. The first sentences should be direct and attractive, not too long, and yet not epigrammatic. Very many writers feel that if they can express themselves effectively in the opening paragraph the plan of the composition, as a whole, will carry them along without serious difficulty. One of the fitting ways of introducing an article is to set forth the point of view of the writer. Such a personal approach should employ an active rather than a passive verb. The historical approach tries to establish a proper perspective. The use of a definition shows the explanatory approach. The descriptive approach suggests by an incident or anecdote the spirit or principle of the whole piece of writing. The choice of one or another of these methods of approach will depend upon the effect the writer wishes to produce in his whole article.

EXERCISES FOR CHAPTER VII

1. Write a paraphrase of a short article or of a paragraph of a long technical article.
2. If you know any foreign language, discuss the difficulties in translating it into English.
3. Summarize a magazine article.
4. Write a book review of some scientific book.
5. Prepare an outline of this textbook.

6. Write a theme on The Paragraph in the form of a paragraph.
7. Select several paragraphs from a magazine, and re-word the topic sentences.
8. Take a long paragraph from an article and break it up into several short ones.
9. Take a chapter of the Bible in the Authorized Version, and group the verses into paragraphs.
10. Submit an outline of a laboratory exercise.

BOOKS SUGGESTED FOR CONSULTATION

R. W. Neal: *Thought Building in Composition.*

T. C. Mitchell and G. R. Carpenter: *Exposition in Classroom Practice.*

CHAPTER VIII

EXPOSITION IN ORAL EXPRESSION

The Significance of Speech. Exposition is employed not merely in writing but also in speaking. In fact, if we but stop to think, we will have to confess that we have learned much of what we know through the medium of speech. We learned to talk before we learned to write; we received our earliest impressions and our first ideas through the speech of those who cared for us. We learned the names and the uses of the objects around us by hearing some one tell them to us, either to safeguard us in our ignorance or to satisfy us in our questioning. Frequently the questions that we asked about objects that perplexed us or experiences that interested us, were entirely irrelevant to each other, and required but a meager answer, but we had to have some reply before we would open our mind to any further instruction. We asked these questions orally, we did not sit down to write a letter. The answers came to us orally; we could not wait to consult some encyclopedia or reference book—even if we had been able to understand the

discussion once we found it. Speech in the home and in the schoolroom was the great medium of our early education. And later in life, in business, the conversation between salesman and customer, between fellow employees, between manager and assistant, determines the great volume of commercial transactions. The telephone makes such conversation possible at distances varying from a block to the width of the continent.

Speech a Means of Instruction. Speech has been a favorite method of instruction in all ages. The story, the oration, the sermon, the lecture, and the popular appeal—all have been the means of oral instruction from the time of the market-place gatherings in Athens to the present-day forum. The masters of any of these forms of speech, ancient and modern, in many cases are people that do not write down their messages. In any crisis, personal or communal, we all desire the help of the spoken word. The crowds will go to hear a political, social, or religious reformer without being urged. The success of many a movement in history has lain with a leader who was an able and thoughtful public speaker. In a quieter way, the teacher in the classroom has the almost irresistible tendency to fall into the lecture habit, taking almost all the time himself in an explanation of his topic, in spite of the weight of theory in favor of the Socratic or catechetical method. The teacher who under-

stands the art of oral teaching in addition to his knowledge of the subject matter of his teaching, has a great advantage over a teacher who has the technical information only. So, whether we think of its public or of its private aspects, of its childhood or of its adult stages, we realize the superior place of speech in all mental development.

Speech for a Technical Man. A technical man must understand the importance of effective oral expression. This importance is brought out if we but mention the possible occasions for the use of speaking ability. He may be required to appear before a board of trustees or an executive committee of management, and to make a verbal report of some work that he has undertaken, or to advocate some specific plan of which he has intimate knowledge. He may be asked to present some results of his investigations at a convention, or he may choose voluntarily to enter a discussion upon the floor of a convention. Practically every scientist will belong to an association of people identified with his branch of science. In the regular meetings of the organization he will wish to take part in discussions, and perhaps will be expected to take his turn in holding the various offices open to election. There are few more pitiable sights than to see the presiding officer of a meeting ignorant of what to do next, or embarrassed to the extent of inefficient control of himself and the meeting.

The technical man may be a salesman handling a specialized product. The twentieth century is seeing the technical man take a prominent place in public affairs. No longer is the engineer, or the architect, or the landscape designer, or the research man, simply a hired man for a commission or an official; very frequently he is on the commission or is the official, into whose hands is committed the work of overseeing the public business. The fact that several large cities that have adopted the city-manager plan of government have turned to trained engineers or other professional men not lawyers for their chief executives is testimony enough to the need of all-around ability, including the power of effective address, in the technical man. The World War brought out several conspicuous examples of great efficiency in technically trained specialists. Nowadays public office demands some speaking and more than likely a good deal. The executive of a city, the head of a corporation, the leader of any great enterprise of business, must be a man who is able to use speech with skill.

The Preparation of a Speech. There are three primary problems facing a person who knows he has a speech to make. No matter how formal or how informal the occasion may be, or how large or how small the audience may be, these three problems must be worked out before the actual delivery. For an important occasion there is usually time

enough allotted ahead for careful study; for a spontaneous participation the importance of these three factors is even more vividly emphasized. Failure threatens the man that disregards them, trusting to the inspiration of the time of delivery to carry him through safely. After several experiences with careful preparation under guidance, the habit of right attack will assert itself to the assistance of the man called upon unexpectedly.

The three problems are: Adaptation, Organization, and Presentation. Each in turn has subordinate problems, which will be taken up directly. These problems do not differ in principle from those facing a man who has a paper to write and to read, or an essay to submit to a periodical, or a report to draw up; they differ more in their mechanical than in their theoretical aspects. The mastery of them comes through practice quite as much as through personal study, or at least through practice in connection with personal study. One cannot become an effective speaker merely by studying a textbook about oral expression; he must have the experience of applying what he has learned. On the other hand, many a person who does public speaking would speak much better if he had the assistance of capable guidance in the three problems just mentioned. A few people may be born orators, but most people who speak do so because of force of circumstances rather than because they

choose work absolutely dependent upon an ability to speak. Careful self-training, therefore, by thoughtful use of one's abilities as occasion demands, is the suggestion that we have in mind for the technical man in his speechmaking.

Adaptation. Adaptation is the relating of the subject matter of a speech to the audience. Both of the factors involved in this assertion—subject of the speech and nature of the audience—can be known ahead of the time of the delivery of the speech, the former without any question and the latter usually or approximately. The two must be considered together, because the field of the subject matter is determined to no small extent by a knowledge of the type of the audience that will hear it. If a speaker is invited to choose his own topic, he wants to know first of all, "What kind of an audience will I have to face? What is the range of the interests of the people in the audience? What is the occasion of their gathering together—the perfunctory requirements of a regular meeting, or some special circumstances, and if the latter, how are these circumstances related to my train of thought?" If a speaker is assigned a topic, it may be taken for granted that the assignment grows out of a conviction in the mind of the person responsible for arranging the meeting, that the interests of the audience have a direct bearing upon the abilities of the speaker designated to add some-

thing of importance to the topic chosen. The task of the speaker then is to understand the mood and the expectations of his audience just so far as these can be visualized in advance.

Out of this primary determination will grow several related but subordinate matters. One will be the proportion of information and opinion in the address. Is the topic as formulated one that is intended to emphasize the instructional element, or the expression of opinion? Is it one about which the people seek to learn, and turn to the speaker for light and assistance? Is it one that involves research or special experiences, such that the ordinary person is not equipped to undertake? Or is it a topic more or less widely discussed but still unsettled? Does it call for a balancing of argument, a refutation and a defense, a taking of sides? Or, again, is it of broad general interest, entertainment being mingled with instruction? An answer to such questions as these will be necessary to enable the speaker to know how to approach his subject.

Another subordinate point of adaptation will be the tone of the speaking, or the attitude to be sought in the actual speaking. Shall the speaker be profound, scholarly, technical? Do the circumstances of topic and audience call for an inspirational address that shall tend to provoke action? Is the occasion one for a popular, witty, or enter-

taining attitude in the speaker? This point of tone cannot well be formulated or altered after a speaker stands before his audience, it must be predetermined. It will shape the selection of the subject matter and its organization, as discussed under the next heading.

A third point of adaptation grows out of the one just mentioned; it is the kind of vocabulary that one chooses in which to clothe his thoughts. Simple truths may be stated in a serious, heavy way, and on the contrary, profound truths may be set forth in an easy, smooth, and simple way. The question of descent to colloquial or slang expressions must be decided. Upon how high a level shall the speech proceed? Shall it be aimed at the heads, the hearts, or the pocketbooks of the audience? Shall it be in danger of going over their heads, or under their hearts? Shall the attitude be one of sarcasm, ridicule, fighting opposition, cordial support, or of plain explanation? By the attitude we choose to assume, we may make or mar a speech. It is wrong to think that studied phrases are not to be used, or that planned witticisms are impossible. One cannot plan every word, or learn his speech as though it were a declamation, but he can and should go over its parts *in words* and fix in his mind certain expressions chosen because of their fitness to the speaker's purpose.

Organization. Organization is the plan of the speech. After having settled the adaptation of subject to audience, the speaker must arrange the available material, or that selected for use, in the most effective way to accomplish the purpose he has in his mind. This point is a more mechanical one than the preceding, but none the less important. A speaker rarely exhausts his subject—he may, however, exhaust his audience. A good speaker will have such a mastery of the whole field of his topic that he will not in fact or by impression talk himself out and come to a final end of all he *can* say. He must have a foundation deep enough and strong enough to support all he *may* say. He must have a background clear enough so that his essential thought will stand out unmistakably. Now this implies that the facts of the speaker's theme are tabulated or arranged in such a way in his mind that he is never at a loss as to what to say next. For an adult to forget his speech is worse than for a child to forget his recitation, for a recitation is limited to one manner of expression, whereas a discussion of a subject offers the possibilities of a thorough knowledge of ideas, and allows almost endless forms of expression.

In a mechanical way, then, the speaker must have an outline of his material. That outline will be strictly logical in its choice of the main and of

the subordinate topics. The sequence of the topics will be the sequence best calculated to present the matter clearly and to lead to the desired conclusions. Not invariably, but often enough to be helpful, the time element or the When? precedes the place element or the Where? Both of these will come before the personal element or the Who? and this in turn will introduce the method or the How? If this order should be changed, the revision should follow a careful testing of the phases of the subject in light of the occasion and the audience.

As a part of the outline there are two very important points to note—the proportion of the main topics, and the transitions from one topic to the next. Speeches are conventionally divided into three parts: Introduction, Body, and Conclusion. Accepting this division, we must insist that each functions as it theoretically ought to function. The Body is subdivided into as many main headings as the speaker may select. These are distinct in idea and in treatment. Many a speech has had a carefully worked out Introduction and first point, and then has petered out. The speech is top-heavy. Another speech may require time to get under way, repeated cranking of the engine as it were, but will come to a splendid finish. Not infrequently a speaker in a pulpit or on a platform will start well, and then get lost from the path of his speech, or will dawdle along without good ter-

minal facilities. Sometimes a point is left undeveloped, leaving the impression that the speaker is unconvincing. In any of these cases the speech lacks a proper proportion of elements.

Transitions are statements or passages that bridge over the distance between two successive topics. Thoughts of equal importance in a speech may not have any very close relationship logically, but whether they do or not the step from one to the other should be decisive and clear. A Rubicon is to be crossed, and the audience should be made to understand without any possibility of doubt that, whereas the speaker was just now on one side of the division, he is now on the other. Whenever the speaker passes from one topic of his address to the next topic of equal rank, he effects a transition. The length of the transitional element varies according to the importance of the two topics, or according to the greatness of their divergence in thought. Usually transitions are brief, frequently a single word, very rarely more than three sentences. The inferential words like *therefore*, *now*, *next*, *however*, etc.; or phrases like *on the other hand*, *leaving this*, *let us consider*, etc., are examples of transitional elements. A summarizing sentence or an anticipatory suggestion may be used. Sometimes without any such words, a change of position, the alteration of the pitch of the voice, or a gesture, may be sufficient to convey the idea of transition;

these are usually employed along with a suitable word or phrase.

Under organization of material comes the use of figures of speech and other points of rhetoric. Just how many examples or anecdotes to give, just how many illustrations to use, and further, the quality of them, whether humorous, personal, or imaginary, are matters to be thought out in advance of the delivery of the speech. Exposition, whether oral or written, should be as concrete as possible. Concreteness is secured by vocabulary in part, but also by frequency and by type of illustrative material. Explanation, as has already been said, requires a starting with familiar ideas. The point of departure must be a station easily recognized and frequently visited. The points along the way follow then in cumulative fashion.

Presentation. Presentation is the planning of the method and manner of delivery. A distinction is made between presentation as the preliminary work, and delivery as the actual giving of the speech. The latter has to do with elocution, voice culture, proper breathing, and many other important matters beyond the province of this textbook. The former has to do with a few principles of conduct that we will discuss briefly.

Speaking is primarily the bringing of the mind of the speaker into contact with the mind or minds of his audience. The great intangible human factor

enters. Principles rather than rules can be laid down. The first principle to remember is that the thing that is being said is most important. A speaker filled with his subject, thinking of his message, will not need to bother about details. Whether his feet are together, whether his hands are in his pockets, whether his gestures are graceful—are questions that will not intrude themselves. A second principle is that a speaker may use one or more of several helps in presenting his thought—such helps as a blackboard diagram, a picture, an object, even notes that contain dates, figures, or catch phrases of his outline. There is monotony and consequent loss of effectiveness in too great excitement as in too great stiffness. Loudness of voice is not to be confused with emphasis, or pitch of voice with making people hear. Gesticulations are not gestures, nor is walking up and down an indication of self-possession. To come back to a positive statement, the helps to effective speaking are to be used even though they may not be conventional; they simply must be helps and not hindrances. At first a speaker will think of details of appearance too much, later perhaps not enough. A speaker has something to say, and he will do whatever in his judgment will help him say his thoughts in a manner to convince and to persuade his hearers.

EXERCISES FOR CHAPTER VIII

1. Prepare a five-minute talk on a topic from your own experience.
2. Prepare a five-minute talk on a topic of current scientific interest.
3. Submit an outline of your talk.
4. Write out the introduction of your talk.
5. Write out the conclusion of your talk.

BOOKS SUGGESTED FOR CONSULTATION

I. L. Winter: *Public Speaking.*
F. B. Robinson: *Effective Public Speaking.*
C. H. Woolbert: *Fundamentals of Speech.*

CHAPTER IX

THE BUSINESS LETTER

The Business Letter Type. Probably the first piece of writing that a graduate of a technical school will be called upon to undertake will be a letter. It may be a letter of application for a position, it may be an acceptance of an offer, or, less professionally, it may be a letter to home folks, counseling over future plans. For centuries the letter has been regarded as a literary vehicle of thought. One of the most interesting studies of great men is that of their correspondence, as almost any careful biography will reveal. It is frequently the "Life and Letters of ——" that is stamped on the backs of the volumes of biography. Anthologies of letters of literary people have been published not merely for their biographical value, but for their literary charm. Letter writing is an art that any college man may well afford to practice with diligence. But there has come a new and a distinctly modern viewpoint to letter writing—that of the business man in his business transactions. At

first the business letter was not regarded as a separate type; then it came to be rather sharply distinguished from the social letter, perhaps in part as a protest against the stilted and verbose language frequently found in the literary type. Now there is a tendency to pay just as much attention to the style of writing in business letters as in the most careful literary work. The business man is coming to see the advantage of careful English, even of choice diction, without any false standards of taste in its style. A type of letter has arrived that holds, in exposition, the place the literary letter holds in narration and description.

The Point of View. The number of textbooks of business correspondence has increased greatly in the last decade. Most of them, however, have been adapted to training the stenographer or the secretary, or to giving suggestions for the self-help of the employer whose schooling has been either far distant or scanty. Such textbooks serve their purposes undoubtedly, yet they leave something to be desired from the point of view of the modern office man whose college experiences have been both varied and recent. In this discussion, we shall adopt the standpoint of the college-trained man who is thrust into unfamiliar surroundings in an office and is given some business responsibility. He probably has nothing to do with the hiring of the stenographer or with setting the office customs

of his firm; he has a stenographer for an hour or two a day, and he has a specific phase of the business to handle, requiring the writing of letters, reports, or records. He is reasonably well grounded in grammar, but he lacks the ability to organize his ideas in a clear, concise manner when facing his assistant or his superior, and he is unfamiliar with the atmosphere of business. Time is needed to enable him to acquire a knowledge of the details; his experiences will stand him in good stead for the broad principles. Anything that will hasten his acquisition of essential facts and methods will be of decided benefit to him.

The Form of the Letter. There are certain points that such a man, trained in the classroom but not in the office, must know as he comes to write business letters, beyond familiarity with the business methods, processes, and purposes of his firm. He must know, first, the *form* of the business letter. The stenographer usually takes care of the mechanics of the arrangement, but the composer of the letter must know at a glance whether the proprieties have been observed, and if not, how to set any error right. The policy of the firm may designate certain observances—*e. g.*, the spacing, the form of the complimentary close, or the method of folding the sheet. These points should be thoroughly known to the composer, and always checked by him in the letters that leave his desk.

He must further see that every letter is complete in its form as well as in its subject matter. To be complete a letter must have the six parts: the heading, the inside address, the salutation, the message, the complimentary close, and the signature. These six parts are assigned definite places on the sheet of paper, with an eye to neatness of appearance as well as to logical significance. The *heading* gives the sufficient address of the sender and the date of writing. Almost all firms have printed letterhead stationery, the information in which need not be repeated by the typist. The date is always to be stated, the approved location being about one inch below the lowest line of the printed head, and on the right-hand side, keeping to an approximate right-hand margin for the body of the letter. The *inside address* states the name and the sufficient address of the person or firm to whom the letter is sent. Its position establishes the left-hand margin of the letter and is about an inch below the line of the date. It is commonly divided into as many lines as are required for each item of name, position, street, and post-office address separately, each significant word being capitalized. The *salutation* is a formal beginning of the letter, required by usage and by courtesy. Its position is flush with the left-hand margin on a line by itself, distinct from the inside address just above it, and from the message just below it. It

is punctuated as anticipating the message, usually with a colon, sometimes with a comma. The simplest and best forms are: Dear Sir: or Gentlemen: singular and plural masculine; and Dear Madam: or Ladies: single and plural feminine. With officials, a name with *Mr.* or other appropriate title, or a title alone may be used. The addition of the personal pronoun *My* to the word *dear* lessens the formality in friendly letters, but increases it in formal letters. The *message* is the body of the letter, arranged in paragraphs according to good paragraph principles, varying somewhat in function according to the type of the letter. It is punctuated as a complete portion; that is, is not carried over into the ending by a participial construction, such as "Thanking you for attention," or "Hoping to hear soon." The *complimentary close* is the courteous statement leading directly to the signature of the firm or person sending the letter. It is put two or three spaces below the last line of the message, and begins at the vertical middle line of the sheet of paper. Its punctuation is a comma. The approved forms for business letters use the words "truly" or "respectfully," either with or without "very," but never without "yours." The order of the words used is not fixed, and only the first one is capitalized. The *signature* for a firm letter is commonly the typed or rubber-stamped firm name followed on

a separate line by the signed name of the person composing the letter. If the firm name is not used the signed name of the writer may be followed by the typed position occupied by him in the firm. The position is slightly to the right of the beginning of the complimentary close. In addition, the typist may insert the initials of the composer and her own at the left-hand margin of the letter on the next line below the signature. The whole letter is centered upon the sheet, the length of the line depending upon the total length of the letter. An ample margin is desirable both for neatness of appearance and for convenience to typist and to correspondent.

Types of Business Letters. The second point that the composer of business letters must know is the exact nature of the problem before him which must be solved by means of his letter. This knowledge involves, fundamentally, acquaintance with current business methods, and more specifically, familiarity with the various types of business letters. The discussion of the fundamental acquaintance with business methods lies beyond the province of this textbook, and in fact cannot be gained completely from any textbook. The various types of business letters can be characterized briefly, the differences being in the methods of handling the necessary information to be conveyed to the reader. The types are alike in the matters of form just

discussed, and in the matter of their broad attitude of courtesy and sincerity. We will take the letters in order of their inherent difficulty of composition, understanding that each type will include the original letter and its reply.

Letters of Application are often classified as sales letters, and, if so, really belong later in this list; it is true that they may be regarded as attempts to sell one's services, and therefore require all the psychology that underlies a sale. But from a slightly different angle, they are a preliminary type of letter, preceding any business experience, at least so far as the writer of the letter is concerned, and are most effective when reasonably personal, and quite natural. The essential contents, following the actual application for the desired position, include a statement of the writer's qualifications, his capacity, and his experience up to the time of application.

Letters of Recommendation are closely associated with Letters of Application; oftentimes they are used as inclosures with an application. When written directly to a prospective employer, they state concisely the circumstances that call them forth, the facts of the applicant's career, the writer's judgment and indorsement (or disapproval). Usually Letters of Recommendation are written upon request, either of the applicant in whose behalf they are sent, or of the prospective employer after

he has received an application; sometimes they are written as open letters "To Whomever May Be Concerned," in which case the words of recommendation are somewhat more general in character. They then serve more as introductions.

Request Letters, or Letters Asking for Information, are those letters written in pursuit of knowledge that cannot be gained from printed matter, or when printed matter is not available. They may lead to a purchase, or they may be simply routine questions having to do with dates, terms, persons, etc. When the information sought has no direct benefit to the giver of the information, the asker should offer payment of any expense incurred, even return postage. The writer of such a letter must be perfectly clear in his request, courteous in his phrasing, and as brief as possible. The person addressed may find it necessary to refuse the request, but under any conditions he must be sympathetic, exact, and friendly.

Order Letters should be limited to the statement of the goods desired; to include other material is more inadvisable in an order letter than in any other, and is to be avoided in any business letter. If order blanks are supplied by the selling firm, no letter need accompany the blank properly filled out; if the order is a letter, the usual form of a business letter is observed, and the items ordered are tabulated, with columns carefully kept for quantities,

description of goods, and prices. The letter will close with a reference to method of shipment desired, and manner of payment adopted. In the same class with order letters are Letters of Acknowledgment, whether of the receipt of the order, or of the receipt of the goods by the person who sent in the order. Oftentimes form postal cards are used for this purpose, but not infrequently they are not sent at all. If shipment must be delayed, or if there is any question about goods or customer, then an acknowledgment is desirable.

Adjustment Letters include letters from customers who have some grievance, and letters from the Claims Department of firms in whose hands is the satisfying of displeased buyers. A letter from a customer should state all the facts of the case as he understands them and in the order of their occurrence; it may also include suggestions for settlement. A letter from a firm should be explanatory rather than argumentative, always courteous, and definitely upon the point of grievance. It may state the necessity of further time, but should not be itself delayed on that account. It may properly include some sales material. There are so many kinds of trouble possible in business, from the time of receiving the order, through the packing, shipping, transportation, receipt, and billing, that each case really has to be treated by itself. Certain policies or precedents may determine the contents

of the letter sent to make adjustment, but the personal note should not be lost entirely.

Credit Letters are primarily those letters written by firms to inquire about the standing of a customer, or to establish credit relations with a customer. They may be said to include also letters asking for credit or extension of credit or change of terms of credit. This class of letters has to do with reputations of people, and should be kindly, dignified, and frank.

Collection Letters are usually prepared in a series, each letter adding something in fullness, firmness, or threatened action to the letter preceding it. The problem of the writer is to collect money due his firm and at the same time to keep the trade of the customer owing the money. All reasonable measures are attempted before legal action is threatened; then, if results are not forthcoming, action should take the place of letters.

Sales Letters constitute the big group of letters that require both a knowledge of human nature and business experience for effectiveness. The sales letters of a firm have to fit in with the advertising, the work of the salesmen, the policy of the management, and the exigencies of the business world. Like collection letters, sales letters are written in a series, in which the follow-up letters have a distinct place. The material that is worked into sales letters is taken from all possible places.

The accepted arrangement of the material designates four parts to a sales letter: (1) a point of contact, which is an attention-getting, introductory approach; (2) a paragraph of conviction, which states the excellencies of the article offered for sale; (3) a paragraph of persuasion, which turns these excellencies to the personal needs or desires of the prospective purchaser; and (4) a clincher, which presses home the desirability of a favorable response as soon as may be possible, and shows how or where the purchase may be consummated. The immense variety of ways in which these sales appeals can be made, and the great variety of human beings to whom the appeals can be made, make of the writing of sales letters a fascinating and rewarding task.

Dictation. The third point that the composer of business letters must know is the method of dictating the material for his letters to a secretary or stenographer. Few business men now write their own letters; they formulate the material, and, of course, are responsible for the results. The ability to think clearly and to state concisely just what is in one's mind is an ability that can be cultivated—and must be. It is not merely business acumen and resourcefulness, but is also a psychological quality, a personal faculty. It means the power of analysis and organization of material; it also means placing the results of such thought in its most effective

form for others to follow. This calls for skill in dictation. To organize one's thoughts aloud is not the same as doing it quietly to oneself. There must be a plan based upon sound business principles and also upon all that one can know from study and from experience of the principles of rhetoric. Faults of organization cannot be blamed upon the stenographer; rather the faults of the stenographer may frequently be blamed upon the dictator of letters. Efficiency in taking down data depends to no small extent upon such points as speed of utterance, clearness of enunciation, choice of words, smoothness of grammatical construction of sentences, and incisiveness of meaning. Some stenographers are too literal, some are too ignorant, all are human.

The Spirit of the Letter. A final requirement for composers of business letters is one that must be mentioned, but that need not be discussed at length. It is an unfailing ethical code. The qualities of courtesy, honesty, and fairness are everywhere recognized as fundamental in business; they are no less so in business letters. The spirit of all of the letters of any firm must reflect the real policy of the men in charge of its affairs. There is no rule whereby this spirit can be transferred to words; but ethical principles must be so firmly grasped by every subordinate that they reveal themselves in

the choice of words, the carefulness of expression, and the clearness of thought of the letter.

The Filing of Letters. Anyone who is required to dictate business letters will have occasion to consult previous correspondence, both outgoing and incoming. He must, therefore, understand the broad principles that govern the filing of papers, especially letters. The mechanical details of filing and of finding letters are usually left to clerks or secretaries; but the methods must be familiar to office men, too, both for the sake of counseling with a subordinate, and in order not to be helpless in an emergency. Copies of outgoing letters are made at the time the letter is typed, and are preserved according to the system adopted by the firm, either copybook or filing cabinet. Incoming letters are filed for reference, usually in a vertical file, which allows the sheet of paper to stand on edge, with letterhead to the left, in a folder, or behind indexed guide cards. They are kept in a temporary cabinet until the transaction is closed, then placed in a regular file, and then at the end of predetermined periods, varying from a year to twenty years, according to the nature and the volume of the business, the letters are either put in a transfer cabinet of less expensive construction, or are destroyed. The system of guide cards varies also with the nature and the volume of business, but in general they are so placed that they allow

clear and easy location of a letter sought for. The zigzag or staggered arrangement of tabs is most common, though primary and secondary positions are also used. The systems of indexing files are three: (1) alphabetical, by which the guide cards are provided with single letters or groups of letters showing an absolutely strict alphabetical order; (2) numerical, by which numbers in serial order show the location of any firm's correspondence, in connection with a key alphabetically arranged; and (3) topical, by which words indicating the subject matter of the letters, or possibly, as a variation, the geographical location of firms, are put upon the guide tabs. In this system a subordinate scheme is adopted for firms or for cities or for both. A fairly common variation is also to combine the numerical and the alphabetical plans; another is to combine the alphabetical with the whole name guides. Other modifications can be devised to suit any particular business. Whoever dictates letters must know the system adopted by his firm.

SPECIMENS OF THE VARIOUS TYPES OF LETTERS

Letter of Application

11093 Euclid Ave.,
Cleveland, Ohio,
January 27, 1921.

The Sunset Paint Company,
1015 Warsaw Ave.,
Chicago, Ill.

Gentlemen:

Mr. C. Prutton of the Gladding Varnish Company has suggested that I apply for the position of paint and varnish salesman of the Middle Western District in your company.

I have had three years' experience as salesman of chemical supplies with the Snow Chemical Company, and feel capable of handling your products. A guarantee of $150.00 a month with a ten per cent commission is desired.

For a private interview I can be reached at any time at my address.

Yours very truly,
G. H. I.

REQUEST LETTER

11447 Euclid Avenue,
Cleveland, Ohio,
March 13, 1920.

Mr. John Rockwell,
318 Madison Ave.,
Minneapolis, Minn.

Dear Sir:

I have received a booklet from the Nashville Furnace Company in which is printed a letter from you saying that you have saved coal by using one of their furnaces. The furnace problem at the present time interests me very deeply and I would like more of the details of your experience with this furnace.

Will you please write me, using the return envelope enclosed, and furnish me more information such as the size of your house, its construction, the average amount of coal saved each month, what kind of coal you use, and whether your data extends over several years or only the first that your furnace was in use.

I trust that your reply will not inconvenience you.

Yours very truly,
J. K. L.

Order Letter

3000 Euclid Ave.,
Cleveland, Ohio,
April 4, 1921.

Cluett, Peabody and Company,
New York City.

Gentlemen:

Please ship me by Adams Express prepaid, the following Arrow Brand collars:

6 doz.	Belmont	style	size 14
6 doz.	Devon	"	" 14½
4 doz.	Belmont	"	" 15
3 doz.	Standish	"	" 15½

Payment will be made in accordance with your usual terms.

Yours very truly,

M. N. O.

ADJUSTMENT LETTER

2193 East Seventh St.,
Cleveland, Ohio,
January 20, 1921.

The East Side Department Store,
Newark, N. J.

Gentlemen:

We deeply regret the mistake that our bookkeeper has made. It has placed us in an embarrassing position and has caused you great inconvenience.

Our rush of business has been greater than our clerks can handle, consequently we have been forced to rely upon extra clerical help.

I enclose a corrected bill amounting to $14.90, which is now one week overdue. We realize that the fault has been wholly ours, and in view of our past friendly relations we will allow the three per cent discount which we gave our customers for bills paid by the thirteenth.

Yours respectfully,

P. Q. R.

CREDIT LETTER

2145 Lakeside Ave.,
Cleveland, Ohio,
March 14, 1920.

The Pierce Hardware Company,
Haywood, Pa.

Gentlemen:

We are pleased to be able to grant your request for further extension of credit. This credit will be extended an additional sixty days.

We realize the conditions of your territory have been very unfavorable during the past season. It has always been the policy of our house to co-operate to the fullest extent with our customers. We expect their co-operation in return.

We know that you will make every effort to meet this obligation when it becomes due.

Yours truly,

S. T. U.

COLLECTION LETTER[1]

78 River St.,
Erie, Pa.,
April 25, 1920.

Mr. Henry Burrill,
Conneaut, Ohio.

Dear Sir:

Two months ago you opened an account with us and purchased boxes and crates to the amount of $162.00, but as yet you have made no payment.

As you know, our business is conducted strictly on a cash basis, and we wish you would make some settlement with us before the end of the month, as your account is now two weeks overdue. Let us know what you can do with regard to this matter.

Yours very truly,

V. W. X.

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[1] This letter presupposes a simple statement of the account and two milder letters which offered the customer an opportunity to make a complaint about the goods, or to present some good reason for delay in payment.

SALES LETTER

J. H. HUMPHREY
CIGARS

P. O. BOX 1014

KEY WEST, FLA.

To the Smoker
of High-Grade Cigars

Dear Sir:

You would smoke three or four cigars from a box of them if I could come into your office and leave one hundred, with a request that you try them for a few days. I cannot come to you, as I must induce thousands to smoke my cigars. Won't you let me send the cigars to you by Parcel Post, and give them a trial? If they fail to please you, return them. I will make no charge for the few you smoke, if you do not keep them.

The cigar I offer you is made in two shapes, Londres and Panetela, both four and three-quarter inches long and of standard thickness; filler, Havana selected for mildness and aroma; wrapper, Havana of good quality, imported. There are few cigars on the retail market as good at twelve cents each. These cigars are not held in storage. I will place them in your hands, fresh from the workman, either shape, by the hundred, for Eight Dollars.

The ten day trial offer is to demonstrate my faith in these cigars, and to prevent your buying them if they do not please your individual taste. If I were not making good cigars, worth the price, I could not ship them on this plan.

Sign and mail the trial blank in the enclosed stamped envelope and see for yourself how superior perfectly fresh Havana Cigars are. I believe you will like them, and am willing to back my judgment by standing the expense of the demonstration.

Yours truly,
J. H. HUMPHREY.

EXERCISES FOR CHAPTER IX

1. Write a letter answering an advertisement that you clip from a newspaper.
2. Write a letter of recommendation for a classmate for a position advertised in a newspaper.
3. Write a sales letter concerning some product advertised in a popular magazine.
4. Write a sales letter concerning some specialized technical product, taking the "talking points" from a magazine advertisement.
5. Investigate the history of "The Better Business Letter Association."
6. Consult the catalog of the Library Bureau to find filing devices explained. Report on the systems.

BOOKS SUGGESTED FOR CONSULTATION

E. H. Gardner: *Effective Business Letters.*
C. H. Raymond: *Modern Business Writing.*
C. B. Hotchkiss and E. J. Kilduff: *Advanced Business Correspondence.*

CHAPTER X

JOURNALISTIC EXPOSITION—THE NEWSPAPER

Kinds of Periodicals. Next to business letters, the man in technical work will be called upon most frequently to write some copy for newspapers, magazines, or trade journals. The first of these includes the daily and the weekly paper, whose primary purpose is the publication of current news. It has the least connection of the three with technical exposition, because the printing of news is often a mere stating of facts without much of explanation involved. The second type includes all sorts of so-called popular magazines, but for our consideration will be narrowed to the informative magazines, barring the all-fiction form. This type comes within the range of technical writing somewhat more than the newspaper, because its appeal is more permanent and probably more distinctive than that of a journal of current events. The third type is a still smaller group, very definitely within the interests of the skilled workman. The

three types of publications have different functions and present different problems in the treatment of their material—in arrangement, style, and use of accessory matter, such as illustrations, etc. All of them are worth brief study in a textbook on exposition; the first will be taken up in this chapter, and the other two in the next.

Journalism. Journalism is now ranked as one of the professions—a study in itself. It is defined as: the business of managing, editing, or writing of journals or newspapers; or according to Webster's *New International Dictionary:* the collection and periodical publication of current news. Its origin goes back more than three centuries to the first newspapers in Venice, Paris, and London, or even farther, if we accept the statement that the oldest newspaper known is the *Peking Gazette*, started in 1340 as an official bulletin of news in the capital of China. As the means of intercommunication and transportation have developed in the last eighty years, the number, the quality, and the influence of newspapers have increased wonderfully. An interesting study might be made of a comparison of American and European newspapers, and of the injurious and beneficial effects of the newspaper; but these are outside the province of our discussion here. It will be sufficient to note the fact that preparation for the profession of journalism is now taken from the apprenticeship plan of the earlier

days and transferred to schools or to departments of universities. The first such school was the Joseph Pulitzer School connected with Columbia University in New York City, founded in 1903, opened in 1912. By 1915 there were thirty-nine colleges or universities in this country that offered courses in journalism, with seventy-two teachers and more than two thousand students. Not all of these aim to prepare the students for a professional career, and those that do not have separate departments of journalism place the courses offered under the Department of English, thereby emphasizing the training in composition more than the professional purposes. Even high schools give instruction in journalism, often in connection with work on the school monthly publication. For men who have already decided upon a scientific or engineering career, the details of instruction in journalism have no particular interest. There are, however, several phases of the subject that are helpful, and that come distinctly under the principles and methods of expository writing.

The Contents of the Newspaper. The connection of exposition with journalism is brought out by examining the range of the contents of the daily newspaper. In 1915 Doctor Wilcox tabulated the contents of one hundred and ten dailies from all sections of the United States. He chose five headings and found the proportions of the material to be:

News		55.3
War	17.9	
General	21.8	
Special	15.6	
Advertisements		32.1
Opinion		7.1
Editorial	3.9	
Letters	3.2	
Illustrations		3.1
Literature		2.4
		100.0

J. E. Rogers, *The American Newspaper*, p. 48.

Of course, war news bulked large during the period of the war; but, on the other hand, the general news would absorb about as much space as was given to the war news, when we consider it in proportion to the total contents of the papers. There is no reason to think that the relative amounts of material would vary greatly at any time or even at any season of the year. Of the classes named a considerable portion of the news, practically all of the editorials, and some of the advertisements come under exposition. A separate chapter will be devoted to the discussion of exposition in advertising; this chapter will discuss the application of exposition to news articles and editorials.

The News Item. The training of a reporter in writing his news story brings out a definite structure which is unique in composition. Ordinarily a theme or essay has an introduction that leads up

to the essential points of the discussion, and establishes definitions, point of view, or some historical fact. But the plan of the news item is to have an initial paragraph, which is usually a single sentence, that gives all the essential facts underlying the item, or in effect the real news of the item in condensed form. The succeeding paragraphs give the details of the incident being related, preferably in the order of their importance, rather than in their chronological order. Such an organization of material is not acceptable when judged by rhetorical principles, and to many people is quite unsatisfactory in its logic. The plan is designed to accomplish two things, both of them desirable and necessary from the standpoint of the newspaper: (1) to allow the make-up editor to cut the story to any desired length to suit the demands of a later edition, without necessitating the rewriting of the whole account; (2) to allow the reader to gain the main points of the story at the very beginning, without having to read the whole detailed account. This opening paragraph is called the *lead*, from the idea of leading the reader to the gist of the news at once. The lead should answer such questions as Who? When? What? How? Where? and Why? the order of these points of information depending upon the reporter's judgment of the significance of the facts involved. In one instance it may be the person, in another the place, in still another some

peculiar happening, etc. Examples of a typical lead are:

NEW YORK, Aug. 10.—John D. Rockefeller, Jr., with his wife and daughter, will leave New York to-morrow for China for the dedication of new buildings of the Peking Union Medical college, erected by the China medical board of the Rockefeller Foundation.

Dr. George E. Vincent, president of the Foundation, and Dr. William H. Welsh of Johns Hopkins University will accompany him.

BOSTON, Aug. 10.—X-ray photographs taken to-day prove that there is an ear-to-ear passageway through the cranium of Harry Shanley, a wounded veteran of the Canadian expeditionary forces, who is under treatment at the Massachusetts Clinic for Diagnosis, attending surgeons announced.

Six shoe buttons which he attempted to pass from one side of his head to the other became clogged and the photographs taken for record clearly show them.

Three of the buttons have been dislodged. One passed out through his ear and two through his nasal passage. Shanley's condition was said to be serious. The phenomenon was caused, Shanley said, by the concussion of an exploding shell in France.

If these points are then taken up in succession for more detailed treatment, the article may be likened to a train of cars, the lead being the engine, and the discussion by paragraphs being the cars. The number of cars is immaterial—the effectual power is in the engine. The engine may even go by itself without any cars. The order of such paragraphs as are appended again depends upon the judgment of the reporter. A local paper recently gave an

account of the visit to the city of Herbert Hoover, who came in the interests of a city-wide financial "drive." Mr. Hoover spoke at three meetings—morning, noon, and afternoon. The lead gave a quotation from one of his speeches, followed by the statement of where, when, by whom, and why it was said. Then other snatches of his speeches, all three being mixed indiscriminately, were given in separate paragraphs, followed by an account of the way he was introduced at the afternoon meeting, and something of the other items on the program, followed by an account of the circumstances of the luncheon meeting at noon, a briefer record of the morning address, and finally Mr. Hoover's plans for the next day. There was no chronological continuity in the article, nor a good logical order; but it was easy for a casual reader to start in at the beginning and get the main facts at once; then, if his interest lagged, he could stop almost anywhere and not miss the big outstanding incidents of Mr. Hoover's visit.

The valuable part of any news story is the opening paragraph or two, or the "lead," so far as the arrangement is concerned. It is excellent practice in exposition to construct leads. Frequently one newspaper that has learned of an event first from a rival newspaper, will direct a reporter to reconstruct a lead from the published story. The point of view has changed with the passage of time and

the differing circumstances; the new lead will be phrased differently, but will tell the same facts. Leads often lack seriously in smoothness, but they are admirable paragraphs for the elements of condensation, accuracy, and a combination of explanation with narration that bring them within the range of our attention.

The Editorial. "Newspapers used to be known by their editorials, now they are known by their headlines," said a witty observer. Although the size of the type in the headlines and the nature of the phrasing reveal to no small extent the policy of the paper, no newspaper neglects the editorial to the point of exclusion. An editorial is defined as: a short discussion of a topic from the point of view of the publishers or the editors of a paper. It is primarily an expression of opinion. An editor selects and arranges the material that is printed in a paper, and oversees the issuing of the paper. Editors are students of public affairs, perhaps of a limited sphere, but nevertheless of a definite department of current news, and therefore their opinions represent some of the ablest and most influential leaders we have.

Not all editorials are expository, but a large proportion of them are. Some give an historical review, some are purely descriptive, some are argumentative, and some are merely miscellaneous comment. Generally speaking, editorials are more

carefully written than news items, because they present the mature thought of thoughtful men. They have a literary style that makes them important for the student of composition. They also show an organization of material that makes them models in writing. The most satisfactory analysis of the editorial form shows the following plan:

1. A general statement of the field.
2. A specific instance within that field.
3. The discussion.
4. An application or conclusion.

These four points are not necessarily so paragraphed, although any multiplication of paragraphs will be more likely to come in Point 3 than in the others. The treatment of the points may vary greatly in length, the second and last being more likely to be briefer than the others. Sometimes the first point is omitted, the editorial plunging at once into the definite point that called forth the comment. The following are good examples of editorials, the second one showing the omission of the general statement, and the first one having two paragraphs devoted to discussion:

A Fading Beacon

Dayton, which for some years has been held up as an example of an industrial city thriving and contented under a city-manager form of government, is likely to lose its distinction if the result of Tuesday's primary election is taken as representative of public sentiment on the question.

Under the Dayton charter six members of the commission were nominated on Tuesday, three of the six to be elected in November. Of the nine or ten candidates for the six nominations, three were Socialists opposed to the manager plan, three were supported actively by the Citizens' league as men favorable to the manager plan, while another group of three called themselves independents and were considered none too friendly to the manager plan, if not actually opposed to it.

The three Socialists led the ticket, the three independents came next and not one of the Citizens' league candidates got on the ticket.

As pointed out by a *Plain Dealer* correspondent last week, the fight in Dayton involved two questions—whether the new commission should be friendly or hostile to the manager plan, and whether a charter amendment abolishing the manager plan should be adopted. The election on the amendment has not yet been held, but the result of Tuesday's primary indicates rough going for the manager advocates when the amendment comes to an issue at the polls.

It is to be assumed that the anti-Socialist vote, which was divided between opposing tickets at the primary, will be strong enough in November to keep the commission out of Socialist control, but the primary vote appears significant of a decided change of sentiment in Dayton since John H. Patterson put the city on a hill.

Save the Oregon

The old battleship *Oregon*, which thrilled all Americans in 1898 by making her great voyage of more than 13,000 miles to get into the fighting in the Caribbean, has reached the age limit and is ready to suffer the tragic fate prescribed for antiquated naval vessels. It will, unless some one in authority rules to the contrary, be taken out to some safe anchorage and used as a target by the naval youngsters. It is a pitiful fate for so noble a vessel. The name of the *Oregon* is connected with one of the finest records of the American navy, and it seems almost a sacrilege to doom the aged and honored ship

to the indignity of target service and a final burial in the ocean's boneyard.

The state of Oregon is very proud of the old ship that bears her name. Oregonians have petitioned that the *Oregon* be given to Oregon to be preserved as a state relic and monument. The petition merits favorable consideration, but the further suggestion that the state relic be preserved at national expense is not worthy at all. If Oregon really desires to save the *Oregon* she ought to be willing to care for the steel-clad patriarch.

No American vessel that took part in the World War and few that participated in the Civil War left so honored a name as that of the *Oregon*. Not since the days of John Paul Jones has the American imagination been so stirred by the exploits of an American ship. Give the *Oregon* to Oregon, by all means, and let Oregon have the caring for her ancient and honorable namesake. (From the *Cleveland Plain Dealer*.)

The writing of editorials is excellent practice because of the qualities of exposition involved and the necessity for organizing the material to accomplish a definite end. The reading of editorials in a good daily paper is a valuable habit, because of its aid in the cultivation of literary appreciation and the broadening of one's intellectual horizon.

The Work of Editing. There are a few details in journalism that may be worth a brief mention for the benefit of any that may have the editing of copy to undertake. The first point is the planning of space; an editor has a fixed amount of space to fill, and must select and arrange his available material to fit the space. A little practice in estimating the number of words to a column or a page is sufficient to give one a correct judgment of the

quantity of material, and perhaps of the preparation of his own copy to suit his needs. A second point is the assignment of certain material to definite places in the final sheet or book. This includes the decision as to relative order, allocation of columns, width of columns, especially in special instances, and making up the "dummy," as a model form of diminutive size is called. A third point is the choice of headings. In all large newspapers the headlines are written by one man, who strives to pick expressive words that show action and are not ambiguous; a verb is almost always found in a headline, and all verbs are in the present tense. A fourth point, that of proof reading, has already been discussed on page 89.

Journalism and the Technical Man. The average business man spends a good deal of time reading a daily paper; he can get more out of this reading if he understands the kinds of articles and their organization. His writing for the paper is not so probable in these days with the ever-present reporter and the insistent editor of to-day's perfected journalistic machinery. The man in the office, however, may find it desirable to be prepared for the coming of the reporter, or for the telephone call of the city editor, by having notes which embody the essential facts that will be asked for; these notes may well adopt the form that journalism requires. In many stores and factories, monthly

or semi-monthly papers are published in the interests of the employees. Some one in the office must oversee if not actually direct the work of publishing the paper; and it is not always possible to have a trained journalist for this task. The work has to be combined with other store or factory work. Some of these publications are excellent from every point of view; certainly there are great opportunities to make a valuable aid of them in factory management, especially if some one who not only understands something of the theory of journalism, but who also has an interest in the welfare of the employees, can be put in charge of it.

EXERCISES FOR CHAPTER X

1. Clip a typical news story and write a comment showing the detailed relationship of each paragraph to the lead.
2. Clip an editorial that appeals to you, and outline it.
3. Write an editorial upon a school topic; a local question; a national issue.
4. Criticize an editorial in your school paper as to its organization of material.
5. From the facts of some school happening, write a good lead.
6. Take an article in your school paper and rewrite the lead as for a later issue of the paper.

BOOKS SUGGESTED FOR CONSULTATION

J. E. Rogers: *The American Newspaper.*

W. G. Bleyer: *Newspaper Writing and Editing.*

H. F. Harrington and T. T. Frankenberg: *Essentials in Journalism.*

G. M. Hyde: *Newspaper Reporting and Correspondence.*

C. G. Ross: *The Writing of News.*

CHAPTER XI

JOURNALISTIC EXPOSITION—THE MAGAZINE

Magazine and Newspaper. The magazine differs from the newspaper in several respects, of which those that concern the scientific man are related to the composition and to the purpose of the two types of periodicals. The newspaper is primarily the purveyor of current news, the magazine is primarily a recorder of thought or of interpretation of events, either past or present. The newspaper derives its chief value from its timeliness, the magazine from the quality of its thought. The newspaper must necessarily be prepared and sold as speedily as is consistent with accuracy, the magazine is more deliberately produced. The news stories of the newspaper are so constructed that they may convey their information directly, the articles of a magazine may show all the care and research that go into a book. The frequency of publication suggests a superficial difference; the newspaper is either a daily, semi-weekly, or at most a weekly publication, a magazine is of less frequent appearance, the chief classes being the week-

lies, the monthlies, and the quarterlies. With these differences between the newspaper and the magazine, the student will recognize at once the problems peculiar to each.

Kinds of Technical Periodicals. The words magazine and periodical are used here as practically synonymous. A periodical is literally a publication that is issued at regular intervals, and would also include the newspaper. As a matter of fact, it is almost always applied to the magazine type of publication. The word magazine is an Arabic word denoting "storehouse," and as applied to literary publications suggests varied contents of greater range than would be possible in the usual newspaper. The Sunday edition of many newspapers contains a section called a magazine section, which has short stories or installments of longer novels, essays, biographical sketches, and what is called in journalism, "feature stories," which are accounts of customs, people, or places that have a timely interest and yet are different from news. Omitting those publications which contain only fiction, we may divide periodicals into three groups: the so-called popular magazine, the broadly scientific periodical, and the technical or trade journal. The differences between members of these groups is largely in the purpose of the magazines, only slightly in the methods of organizing their material.

The Popular Magazine. The popular magazine is so named because it appeals to people in general rather than to any limited class of people. Almost every issue, if not every one, will have a wide range of subject matter. There will be, for example, an historical narrative, some poetry, an essay on a political or economic topic, an account of some one's travels, and fiction, both short and serial. Exposition is illustrated by the essay and by the articles that *explain* the subjects of which they treat. Picking up current copies of such magazines as *Harper's*, *Century*, *Scribner's*, *Everybody's*, *American*, or *Saturday Evening Post*, all of which are examples of the class under discussion, we find the following titles that illustrate the instructional purpose of the magazines for general readers: "The Way of Capital," "The New British Empire," "The Natural Resources of Alaska," "A City of Contradictions," "The Mind in the Making."

Frequently there are special departments into which such articles are put, as, for example, the heading, "Everybody's Business," which until recently appeared in the *Saturday Evening Post*, or, "Things Everyone Should Know," in one of the metropolitan Sunday newspapers. The following titles are taken from successive issues of the former: "The Labor Savers," "Our Last Undeveloped Empire," "Watering Our Deserts," "Oil from Rock Shale."

Articles such as those whose titles have been quoted in the two lists are meant for the mass of people who read. The audiences of the popular magazines are composed of people with a common school education, the average Americans, or the mainstay of our citizenry, as such phrases are usually used. Anyone addressing this great audience, then, must choose his topic, and phrase his discussion of it with a clear, vivid touch. The organization of what he has to say will almost inevitably throw itself into the broad requirements of all writing. The style—the diction, the vocabulary, and the personal qualities—will be the test of his success. He must have his readers in view continually, adapting his discussion to the minds of those whose ignorance of his subject is extensive, and whose interest in what he is saying must perhaps be artificially stimulated.

The Scientific Periodical. The next group of periodicals that we have in mind appeals to a much more limited class of people. The scientific periodical is one that presupposes an interest in science on the part of its readers. It does not need to use devices to stimulate flagging or intermittent interest. It frankly implies, "This magazine takes for granted that you already know something about science, and are so interested in it that you will want to find out more; we aim to lead you on into the attractions of general science." And yet

the scientific periodical does not go so far as to say that the reader must have a specialized knowledge of the field. The range of material is great enough to include several branches of science in one periodical. Examples of this type are: *Scientific American*, *Scientific Monthly*, *Science*, *Illustrated World*, *Popular Science Monthly*, *Science and Invention*, and *Popular Mechanics*. In these magazines are articles that will interest those people who love Nature, those who care for machinery and new inventions, and those who take up the experimental phases of science provided by physics and chemistry. The following titles taken from one issue of the *Scientific American* will indicate the range of general scientific appeal: "The Smallest Animal in Existence," "The Fritton Decoy—a Curious Method of Snaring Game," "The Attar of Roses," "Textile Fibers," "The Salt Wells of China," "Evolution of the Golf Ball," "German Airship Construction During the War."

The problem of a writer of articles for this group of periodicals is one of organization or arrangement of material rather than one of vocabulary or vividness of style. The source of appeal is transferred to some extent at least from the personal qualities of a clever writer to the possibilities of an attractive theme. The writer can presuppose some knowledge of subject matter and therefore of vocabulary on the part of his readers, and also a keener interest.

The problem, then, is that of securing a particular subject capable of development from a new angle, or of treatment in a thorough fashion. The phrasing of the title and the approach of the first paragraph lead to a logical working out of the subject and some definite conclusions.

The Trade Journal. The trade journal appeals to a still smaller number of readers and presupposes a still greater interest. A trade journal is a periodical issued by persons in charge of special pursuits, or for those readers who are identified with a special business or profession. The class may properly include some periodicals that are not concerned with a trade in its narrower sense; it will include the official organs of societies or associations whose purpose is definite and whose field is limited. Examples of trade journals are: *Aeronautics*, *Modern Language Notes*, *Medical Journal*, *Chemical Age*, the *Journal of the Society of Mechanical Engineers*, and *Power*. The articles that are published in such periodicals are of direct help to the members of the organization, or followers of the occupation concerned. A person interested in general science would find little in any of them to attract him. The problem of the authors of articles in this class of periodicals is one of both subject matter and style. He must present material that is new or fresh and yet at the same time show a method of presentation that is effective

with people that are reading on the subject continually. Some piece of original research or some interpretation of known facts that is original must be the starting point of the article. The style must avoid the dull, uninteresting recital of facts, but must embody the personal enthusiasm of achievement. There are two cautions necessary: first, the presupposition of the reader's knowledge must not allow a neglect of carefulness in writing; the interest of the reader will not carry him over loose or inaccurate expression; and second, the author's own fascination for his subject must not be so blind as to let him think he can disregard attention to the vehicle of his thought. Long devotion to a subject has more than once led to carelessness in the preparation of important discussions of the subject. Excellence of composition must be the constant desire of a writer on technical subjects. Individuality of style will not counterbalance any scientific untruthfulness, but it will be a decided asset in addition to complete accuracy of facts. Choice of words may not require minute explanation, because of a warranted assumption of knowledge, but sentence structure, paragraphing, outlining, and unified development will demand full attention.

Short Forms of Periodical Writing. What has been said in this chapter has applied especially to long articles or essays; there are, in addition,

certain short forms that are expository in nature. Most periodicals include paragraphs of comment on current news in the field covered, editorials, book reviews, personal items, and answers to queries. These short forms present no particular literary problems, but do require the application of the principles of exposition. Some have already been covered in previous chapters of this book. The chief difficulties encountered are, first, adaptation to the condition of the readers of the periodical, and second, observance of the essential qualities of expository writing.

EXERCISES FOR CHAPTER XI

1. Take the current issue of any popular magazine and group the titles of all the articles according to type.
2. Discuss the magazines devoted to your own department of study.
3. Take some one magazine that you habitually read, and discuss its table of contents and the organization of material.
4. Compare and contrast two magazines in your department of work.
5. Compare the weekly magazines and the monthly in regard to style of writing and method of organization.

BOOKS SUGGESTED FOR CONSULTATION

J. B. Opdycke: *English of Commerce.*
A. Tassin: *The Magazine in America.*
Articles in Encyclopedias under "Periodical Literature."

CHAPTER XII

ADVERTISING AS A METHOD OF EXPOSITION

Advertising and the Technical Writer. Another form of writing, closely associated with a study of the periodical, is the advertisement. Advertisements are nowadays written by specialists, sometimes men in the employ of a business firm, but more frequently men connected with an advertising agency that handles upon contract the advertising of several companies. The technical man, employed by his firm for his technical knowledge, is not expected to know the details of such a distinct field as advertising has come to be. But the requirements of his work will sooner or later bring to him the handling of the facts that go into his firm's advertising, or the purchasing of supplies based in part upon the advertising of other firms. In either case a knowledge of the principles underlying advertising is necessary. And further, the theoretical study of exposition cannot remain silent in regard to this important subject, inasmuch as

one of the fundamental principles of advertising is making a clear explanation of a product for sale.

Definition of Advertising. Advertising may be defined as the art of giving information concerning the quality or price of any article or service that is for sale. The word comes from the Latin *ad*—toward, and *vertere*—to turn; it suggests, therefore, the attempt to turn attention to something; to make an announcement or a notice that will draw attention. Advertising has been characterized in a brief way as "organized salesmanship," or "silent salesmanship," or "the seller's signpost to the buyer." It is an art, and yet like all arts is based on a distinct science. Somewhat easier to define is an advertisement. A satisfactory definition, broad, and at the same time exact, is this: Any means by which a product is attractively exhibited to a customer. Another is this: An effective means for placing a salable article before the minds of prospective buyers. Any adequate definition of an advertisement must include a reference to the commercial transaction expected and desired. Advertising has to do essentially with selling—it may be of things or it may be of services; it may be for the securing of something a person does not have, or it may be for the disposing of something he does have. A commercial exchange is always involved. It is in this particular that an advertisement differs

from an announcement, which is a mere statement of fact or conditions with no element of appeal for a sale or a purchase, except an implied one.

Kinds of Advertisements. Several schemes of classifying advertisements have been advanced. It is admittedly difficult to devise a classification which shall be elastic enough to include the many and varied forms of modern advertising, and at the same time have the coherence of a system. Subdivisions have to be resorted to in order to accomplish this. Probably as satisfactory a plan as any is the following:

Stationary	*Circulating*
Signs	Newspapers
Objects	Periodicals
Displays	Catalogs
Samples	Letters

For the purpose of the study of exposition the first group may be neglected entirely, and the second group may be discussed only in broad principles. Letters have already been discussed in a chapter by themselves, and catalogs do not so clearly involve exposition. But the printed advertisement in a magazine or paper does present a very interesting and important topic.

Psychological Principles. The best studies of advertising on its psychological side have been made by President Walter Dill Scott of Northwestern

University, published in *The Psychology of Advertising*, 1910 (Small, Maynard & Company), and Professor H. L. Hollingworth of Columbia in *Advertising and Selling*, published for the Advertising Men's League of New York City, 1913 (D. Appleton & Co.). Their conclusions have been confirmed by the experience of many others. In summary form, they find four principles of psychology that underlie the preparation of an advertisement. In the order of their employment these are: (1) Attention, that quality of the human mind that leads it to respond to a stimulus; (2) Association, that quality that links a new, incoming impression with past experience, and identifies it; (3) Suggestion, that quality that relates an incoming impression to the wants or desires; and (4) Emotion, that quality that leads to a definite response or reaction, either favorable or unfavorable. Transferred to the function of an advertisement, these principles mean that any given advertisement should aim: (1) to secure the attention of the reader; (2) to hold that attention until the whole advertisement has been read; (3) to create a desire in the mind of the reader for the articles advertised; and (4) to induce (favorable) action in regard to the purchase of the article. Condensed still further, these four principles may be put in the imperative form, with reference to a definite advertisement, as: Look, Learn, Like, Buy.

The Construction of an Advertisement. The psychological principles mentioned rest upon an analysis of the human mind. The construction of an advertisement in keeping with the principles of psychology is therefore a complex task. The writer of an advertisement must recognize the normal action of the mind of a prospective buyer—maybe only an average person, sometimes a member of a special class. Human nature is much the same, whatever the class or occupation may be. The writer of an advertisement must also remember that the printed advertisement does not have the possibilities that belong to a salesman in taking advantage of any favorable circumstances, or in forestalling any unfavorable condition. The printed advertisement has to stand in a more or less stereotyped form. The writer must use certain mechanical means to carry out his knowledge of psychology; the differing principles have their appropriate constructions in form. The writer's aim is always to sell the product; his method is to set forth its advantages or some one good point in it, in a clear and convincing fashion. This is exactly the problem of the writer of exposition narrowed to the field of salesmanship. The means at his disposal may be grouped according to the psychological principles, and are here tabulated as suggestive rather than exhaustive.

Principles of Psychology	*Application to Advertising*	*Means Used in an Advertisement*
Attention	Attract the attention	Pictures, color, headlines, catch phrases, mottoes, border, margin, style of type, bit of design.
Association	Hold the attention	Description of the article, advantages, converging lines, arrows, hands, unusual arrangement.
Suggestion	Create a desire	Comparisons, bit of reasoning, sense of obligation, profit or advantage to purchaser.
Emotion	Induce action	Address, nearest store or branch, coupons, offer of catalog, special time offer, seasonable appeal, visit of salesman.

The combination of these elements in any particular advertisement is a matter for the best judgment and literary and artistic sense of the copy writer. Principles rather than rules can be laid down. The vehicle, *i. e.*, the kind of a magazine or paper that will print the advertisement, the kind of audience it reaches, the seasonable nature of the product, the market conditions, and a knowledge of the product in all its values and uses must be con-

sidered. The order of the four points mentioned should be observed carefully and a selection made of the best means to meet and to fulfill each one.

In addition to the considerations based upon the principles of psychology, there are a few others that are important for the writer of advertisements. First, the size and the proportion of the dimensions of the advertisement. The cost of advertising has generally been based upon the agate line—*i. e.*, a line of type of column width, set in agate type. Some of the so-called "want ads" are charged on the basis of the number of words; some of the full-page advertisements are given page, half-page, or double-page rates. A new method has been used with success based upon the circulation of the periodical and the number of lines used. A new word has been coined to name the unit of measure: milline, which is explained to mean one agate line circulated one million times, whose cost is found by dividing the cost of each agate line by the circulation. As for proportion of dimensions, the best is considered to be three to five. Magazines are mostly of three distinct sizes: 6½ by 10, illustrated by *Harper's;* 9 by 12, illustrated by the *American;* and 11 by 15½, illustrated by the *Scientific American.* Each of these has close to the three-by-five proportion.

A second important point is the centering of the strategic part of the copy at the optic center

of the page. Psychological tests have shown that the eye of a person falls naturally at a point in the middle from left to right, and about two-fifths of the vertical distance from the top of the page. This point, just above the center of the page, is called the optic center, and is the point at which some important element of the advertisement should be placed, generally the element that fulfills the third of the principles of psychology, that of Suggestion. Third, is the question of the use of white space, or the proportion of printing to whole space available. In a full-page advertisement a larger percentage of white space can be used to advantage than in a half- or quarter-page advertisement. Of course, it is best not to overload a given space, or to try to say everything that can be said about the article in any one insertion. Finally, there is the determination of the length of line and the size of type. This is a matter upon which the expert advice of a printer is of value, but the wishes of the writer of the advertisement should be intelligent, founded upon sound reasons. It is undesirable to have too many varieties of type in the same advertisement, or lines that go all across a wide page.

The Qualities of a Good Advertisement. The essential characteristics of effective advertising do not vary materially from those of effective exposition. They may be stated here as: truthfulness, clear-

ness, conciseness, and human appeal. The ethical standard of modern advertising is very high; inaccurate or misleading copy is condemned not only in theory, but also in practice. The literary standard is improving all the time. It is no longer considered good taste to use colloquialisms or ungrammatical forms in advertising copy. A careful selection of words, especially descriptive adjectives, is recognized as having an important bearing on the effectiveness of the advertisement. Just as there is a tendency to-day toward better artistic sense in advertisements, there is a tendency toward better English. There are also marked tendencies toward a higher plane of ethics and toward the human interest appeal. Some examples of effective English in advertising copy are the following:

EXAMPLES OF EFFECTIVE USE OF WORDS IN ADVERTISEMENTS

"The new grouping of dials and switches, the *improved* windshield and ventilating arrangements, the new and *unusual* steering-wheel, will impress experienced car-owners as distinct *betterments*."

"The fruits and other ingredients are *delicious*, *fresh*, and *wholesome*—such as you would select for your own table use."

"Floors and walls damaged by leaking, *hissing* air valves on your radiators. Peace and quiet ruined by *pounding*, *banging* pipes. Comfort destroyed by air-bound, *ice-cold* radiators. Bank account *ravaged* by big coal bills!"

"*Alert* in style."

"Everything will come back with *through and through* cleanness. . . . Everything will come back correctly and *daintily* folded."

The ruggedness of Webster equipment has deservedly given it high rank for dependable performance in meeting the exacting demands for long, hard usage. Its resistance to depreciation is a factor of great importance in solving the problem of moving materials quickly and economically. It is just this distinction which makes Webster equipment an economical investment, for true machinery economy comes from an ability to give the utmost in service at a minimum cost for repairs and overhauling, thus preventing the serious handling interruptions which are such costly items in production. In this respect, alone, Webster equipment affords unusual satisfaction.

It is logical, therefore, that Webster material handling equipment should appeal to buyers of labor conserving machinery.

If you have an elevating or conveying problem, why not solve it NOW—with the assistance of engineering specialists and a factory having an uninterrupted service record of over forty years.

A Stop Loss Order

AS the coal bill foots up monthly to undreamed of heights, those who pay are ringing the emergency signal in the boiler room. "Keep up the steam pressure" has been superseded by—"Make every pound of coal do its duty."

The Venturi 24-hour chart not only reveals costly methods of boiler operation but affords a constructive guide for changing methods of firing, draft regulation, feed water control, and stoker speed. Thousands of plants are vastly benefited in these high-priced fuel days by the completeness of the Venturi's day and night information.

Every order for a Venturi is a Stop Loss Order.

Bulletin No. 197, "Why Your Power Plant Needs a Venturi"—is ready.

"Where —— Grease is used, not only are oiling costs *cut to the core*, but *infinitely* better lubrication is secured. . . ."

"Throughout, the magazine is *embellished* with artistic treatment of *superb* character."

"If the advertising misrepresents the product, by creating an ugly and *amateurish* impression, it is a drag and not a *tractor*."

(Italics not in originals.)

EXERCISES FOR CHAPTER XII

1. Clip an effective advertisement from a magazine and make a list of the means by which it has applied the principles of psychology mentioned in this textbook.
2. Compare two different successive advertisements of the same company in the same magazine.
3. Construct as effective an advertisement as you can for some product you are familiar with.
4. Look up the history of advertising.
5. Criticize the following definitions of an advertisement:
   a. A description of an article for sale, placed where the general public will see it.
   b. A means by which a product is attractively exhibited to a customer.
   c. An effective means for placing a salable article before the minds of prospective buyers.
   d. Anything that calls attention to something for sale.
   e. A written statement which tends to increase the output of a certain article by convincing the reader that the article is the best.
   f. A combination of pictures, figures, and literature made up for the purpose of selling something.
   g. The means of bringing before the minds of prospective buyers the qualities of any salable article, services included.
6. Take several advertisements and underline the unusual or most suggestive words. What part of speech are these words? What is their derivation or formation? Can you find synonyms that would do just as well?

BOOKS SUGGESTED FOR CONSULTATION

W. D. Scott: *The Psychology of Advertising.*
S. R. Hall: *Writing an Advertisement.*
J. B. Opdycke: *News, Ads., and Sales.*
D. Starch: *Advertising.*
H. Tipper: *Advertising.*
Current issues of *Printers' Ink* and *Printers' Ink Monthly.*

CHAPTER XIII

TECHNICAL REPORTS

Definition. Another form of writing frequently used by the technical man is the report. By derivation the word "report" means "an account brought back" (*Century Dictionary*), or at somewhat greater length, "a statement or relation of facts given in reply to inquiry, as the result of investigation, or by a person authorized to examine and to bring or send information" (*Century Dictionary*). It is distinguished from an essay in that is is based upon an assignment. It implies the previous commission of a task, or an accepted responsibility for a piece of work. Further, it represents personal effort, either in regard to the task itself, or else in regard to an investigation of work done by some one else. Engineering reports are not different from other reports except that the nature of the work done is in the field of engineering, or that the investigator is a trained engineer. The same would be true of agricultural reports, architectural reports, or medical reports. The two essential elements of a report are, in summary, a

definite authorization and a personal participation in the work involved.

Types of Reports. A classification of reports would give us three clearly marked types: Research, Recommendation, and Progress Reports. The *Research* report is one whose primary object is to give information upon a subject. There is a specific piece of work to be done, and the report gives the account of that work. It aims to make a contribution to the knowledge about the subject reported upon. It is based upon a study of all that is involved in the subject. The subject may be a test or an experiment, information about which will be for the benefit of the workers in that field; the subject may be some question of theory, or of legal right, or of scientific principle, a discussion of which will throw light upon the matter; or the subject may be some piece of work performed by another and now investigated and made the basis of comment. All of these forms imply both a studious interest in the topic, and some commercial or official responsibility. The *Recommendation* report involves much of what is contained in a Research report, with the addition that a course of action is outlined. A policy is at stake, and the report examines the bases of several policies, concluding with the choice of some one. There may be several possibilities, of which one is selected for recommendation. The subject may be a series

of tests in a laboratory, a new industrial device, or a study of methods of efficiency, or the alternatives of types of construction; the report will review the various possibilities, and will present evidence, with reasons, for some one of them. More than the other types of reports, the Recommendation report will bring in argumentation. The *Progress* report is one that covers a certain portion or period of the work in question. It is a routine report of an official, or a periodic report covering work up to a certain stage of completion or point of time. It is essentially a report giving information, but it is limited to work for which there is more or less official responsibility. It summarizes clearly the achievements up to date, implying more work to be done in the future. It is called forth by legal or official requirements.

There is another type of report, sometimes referred to as the *Academic* Report, that overlaps with the three named. This type differs from the others in function, rather than in organization. In fact, an Academic Report may be a Research, or a Recommendation, or a Progress Report. It is prepared not so much for the information it may contain as for the training it will give to its writer. The facts it states will probably not be a contribution to the knowledge of the subject, but they will add to the information of the reporter. The compiler rather than the public is chiefly con-

cerned. This type is distinctly a school exercise, but is made as much like the commercial report as circumstances will permit.

The Qualities of Reports. Inasmuch as reports are one of the outstanding forms of expository writing, the qualities that we have discussed as essential to all exposition will be required in reports. These qualities are: clearness, accuracy, and unity; their bearing upon reports will be quite evident. In addition to these three two more should be found in all reports: (1) completeness, and (2) the quality of being analytical. The quality of completeness should be found even in routine reports, in the sense that the report must cover the full period indicated, whether a year or quarter or whatever the case may be. An annual report, for example, must cover a full twelve months, not eleven, or eleven and a half. In another sense, completeness must characterize all reports, in that no portion of the original assignment should be omitted. If a report is to cover a certain investigation, it must cover it all, and not neglect any portion of it. If it does, the author of the report lays himself open to the charge of prejudice, or of carelessness. The quality of completeness must, however, be balanced by that of conciseness; in other words, no report should be padded by wordy discussions that get nowhere. Such discussion as is pertinent to the object of the

report is of course entirely in place; but no other discussion is. This quality, then, touches upon that of unity, which means that the writer must not get off his subject. The report must be carried along naturally to a full conclusion and yet not be overloaded with details. The second added quality is that the report must be analytical in its treatment of the subject matter. When a person takes up a report upon a subject, he expects to find the subject studied, examined, analyzed. No mere loose explanation, no general description, no prejudiced argument should be met. A report must attack a problem in such a way as to lay bare the principles involved, and get at the essence of the matter. This leads into the question of the arrangement of material, which will be discussed separately in the next paragraph. Here, the thoroughgoing, studious care with which a reporter must go into his subject is meant.

We have spoken of qualities of the report; there are two qualities that are personal that should be mentioned briefly. They pertain to the reporter rather than to the report that he writes. They are: (1) honesty, and (2) neatness. Honesty differs from accuracy, already included, in that it involves the mental and moral attitude of the writer. The author of a report should be free from bias or prejudice. He must approach his task with open-mindedness if his conclusions are to be valued.

An accurate report *may* be written by a dishonest man; an inaccurate report *may* be written by an honest man. Honesty is a matter of attitude, accuracy one of results. Neatness is another characteristic of the scientific man, whatever his particular branch. Whatever applies to work in a drafting room or an office, to field notes, or to laboratory notes, will apply with added force to the preparation of reports. It is very essential that the copy be legible, clean, and attractively arranged.

The Organization of a Report. A good deal has been said about the degree of formality that must be found in a report. In the last analysis the question of formality is one of attitude, rather than of organization of material. A writer of a report may have decided sympathies with the public or with laymen, and yet may feel it incumbent upon himself to cast his facts and his interpretation of them into a more or less generally accepted arrangement. After all, formality means only a widespread method of doing something; it is an absence of individuality. The striving after individuality may lead one to so loose an organization that real effectiveness is lost, and at the same time prove offensive in its conceit. On the other hand, an extreme attention to form may be so stiff and bare of vigor that the overdone report will discourage readers before they begin. There is an ideal be-

tween these extremes, which involves the personal approach, and presents the facts in a skillfully organized fashion. Such an organization of material may well follow these headings, the order of which is logical:

1. An Introduction. A report, if it is going to carry out the principles involved in its literal meaning, will have a preliminary statement which explains its authorization, and names the recipients of the report. The most common form of such a statement is a note or letter of transmission, which is addressed to the individual or group of individuals who assigned the task being reported upon, and the message of which is confined to notification that the task is finished, the account of the work itself being embodied in the report. The letter is drawn up as any business letter is, and accompanies the report; if the whole is printed, the letter of transmission appears next to the title-page. In certain instances, when reports are short, the report constitutes the body of the letter, after the announcement of the completion of the work, with the signature of the reporter following as in a letter. Instead of a letter of transmission (sometimes the word transmittal or transmissal is used), other forms of introduction are found—*e. g.*, a statement of the official relationship of the reporter to the recipient of the report, a list of the personnel concerned with the assigning or the preparing of

the report; an acknowledgment of gratitude for assistance in the preparation of the report, or a list of books consulted. Sometimes one or more of these forms is added to a letter of transmission, usually following it. If the report is long, and if it is printed in pamphlet or book form, a table of contents, or a brief topical outline is inserted after the other forms of introduction.

2. Statement of Object. The report should commence with a restatement of the commission, either verbatim, or else as the reporter understood it. Just what the reporter set out to do, the field covered by the report, the purpose that prompted the investigation—properly come first. It may be of additional value to state the object of the report both negatively and positively.

3. Summary of Results. It is logical to place next a brief statement whether such an object as has been defined was fully attained or not. The conclusions of a *Research* report may be put in tabulated form; the recommendations of a *Recommendation* report may be listed, without comment. The reason for putting such a section of the report just here is to save the time of a busy executive, who is interested in results rather than in methods of reaching those results. He has in mind a definite inquiry; now that search has been made for him, he wants to know the conclusions at once. At some other time, he, or perhaps some other official,

will check the steps by which those conclusions were reached. If he has confidence in the ability of the person or persons to whom the work was intrusted, he will want to come at once to the findings. The Summary of Results is therefore placed near the beginning of the report.

4. Outline of Methods. In order that a reader may follow the account of what was done in carrying out an assigned task, the writer of a report will tell the methods he employed. Conditions of work are so very important in most scientific research that they must be stated. If instruments or any apparatus were used, the various pieces must be described, especially if at all complicated or unusual. If two or more people had to work together, the method of co-operation must be explained. If an official has met with any extraordinary circumstances in the discharge of his duties, he must state them, for they may affect his findings.

5. Data Sheets. Some kinds of work involve the taking of field notes or observations or readings; these or maybe other kinds of work then require reductions or calculations from these notes. In so far as important conclusions are based upon them, it will be desirable to preserve such notes, and, in the case of an original as contrasted with a printed report, to include them in the report. Instead of placing them at various stages of the discussion, it is better to group these data sheets

into a special section and insert them before the discussion. If any question of legality arises in connection with a report, the court recognizes only original sheets as valid. In printed reports, photographs of data sheets are sometimes preserved. If either copies or photographs are kept, they are often put into an appendix, instead of being made a part of the body of the report.

6. Diagrams. Frequently the body of a report is supplemented by the use of diagrams, illustrations, curve sheets, charts, or separate tables. The distinctions between these will be discussed in Chapter XV. Although these may be scattered through the report at the appropriate places, they may better be put together immediately preceding the discussion. This would more certainly be true if the diagrams were large enough to fill a page, or if there were very many of them. A variation of practice in printed reports is to place these as well as data sheets in an appendix.

7. Discussion. The final and in many ways the most important section of a fully organized report is the discussion. This presents the details of the work covered by the report, the steps by which the investigator arrived at his conclusions. It may not be necessary to repeat information that has already been given in any of the preceding sections, but it will prove helpful to the reader if cross references are given to any point previously

stated, or to any of the statistical matter. The order of procedure will best be chronological, tracing the work done in fulfillment of the assignment step by step and showing the interconnection of it all. If conclusions or recommendations have been tabulated under Heading 3, the proof or evidence for them must be presented here. Any one who reads the summary of the results should be able, if he cares to know, to find sufficient reasons for those conclusions. The writer of the report must justify himself in his conclusions. The Discussion is the part of the report that contains the reasons and the account of all the work done in carrying out the commission.

Not every report needs all of these sections; the subject matter will determine which of them are desirable to keep. The order of the sections will not vary usually from the order here given, and no change in order is made even if some are omitted. These sections should be marked by appropriate headings standing on separate lines and possibly centered in the line. It is not necessary to number the sections.

Forms of Reports. In addition to the kinds of reports, we must distinguish three forms of reports, that is, in the outward appearance and mechanics of reports. First, is the card-index form. This means that reports of information or of progress are made out on prepared form cards,

ruled and headed to indicate the facts wanted. The size of card will vary with the amount of information desired and the filing system of the persons using the information. Usual dimensions are 3 by 5, 4 by 6, 5 by 8, but the firms that make office and library supplies have several stock sizes and many styles of rulings. Government postal cards are sometimes used, approximately 3¼ by 5½. The needs of any business can be met. Many factories keep record of inventories, railroads of inspection work, offices of sales, schools of enrollment and grades on cards that can be filed in card-index cabinets for future reference. The convenience of this form of record is apparent.

Second, is the loose-leaf sheet, printed with uniform headings and spaces. This form differs from the cards mainly in size and in method of preservation. Generally speaking, the sheets of paper included under this form are larger than the cards included under the first form. Sheets will vary from the size used in college laboratory experiment binders to those 18 by 24 inches or even larger. Covers or binders are provided for the sheets as they accumulate. The sheets are given headings in a uniform arrangement, the reporter filling in under the headings whatever information he has to offer. More extensive statements will be expected here than on the cards, where figures or detached

words are usually sufficient. Consequently, the problem of correct usage will be present.

Third, is the blank-sheet form of report. This means that the reporter plans his report himself, without printed headings or ruled spaces to guide him. Entire freedom is allowed so far as the form of the report is concerned. Of course, the typewriter is usually employed in preparing the report, and the standard sizes of typewriter paper are used. The most frequent is 8½ by 11, but the legal size, 8½ by 13, is also common. Care should be taken not to crowd the work on the paper, keeping headings clearly separated from paragraph material, and names and figures distinct. Printed reports should have the scheme of organization clear, as is outlined in this chapter.

Readers of Public Reports. Reports that are printed for more or less general distribution may be classified in a still different way, according to the kinds of probable readers. This method of classification will have nothing to do with the kinds or forms already discussed, overlapping with them freely. The readers of public reports may be put into three groups: (1) people interested in general information; (2) people interested in economic or financial facts; and (3) people interested in technical matter. The first class will be those persons who are active citizens, concerned with the development and progress of public enterprises, who

have alert minds eager to keep informed about present-day improvements. The human factors of public enterprise will appeal to them. Some reports, especially reports of Progress issued by a municipal or other public official, are intended largely for this class of readers. The second class will include those persons who are students of economics or are investors in public securities. The practical phases of public work appeal to them, what returns there are, how it affects human life or social conditions. The managers of industries, the employers of labor, the men with money to invest in business—these groups will also be included. The third class will include the specialist, the engineer, the technical man—in short, any persons that follow the constructional features of public work, the complex problems of carrying on an enterprise successfully. Many reports are intended for just this class of readers. As J. H. Hammond remarks: "In making reports the young engineer should present copious technical data in case the report is to be submitted to other engineers, but when it is for the capitalist he should have in view chiefly the presentation of economic facts." A slightly different, but not inconsistent view, is taken by C. F. Lee, who says: "The object of a report is primarily commercial; it is a matter of business. Such technical matter as is necessary to clearness and completeness has place, but noth-

ing further. The temper in which the matter should be approached is judicial. No personal bias or feeling should enter. All should be cold, hard facts, and the conclusion such as can be justly drawn from the facts stated. Everything should be ascertained with exactness, nothing guessed at or left to chance, and no stone left unturned to check conclusions in all possible ways. Pains taken in this last particular will save many a costly blunder."

An academic report is printed to show the form of a report adapted to practice work:

SPECIMEN OF A STUDENT'S REPORT ON A COMMERCIAL SUBJECT

Connellsville, Pa.,
January 9, 1921.

Mr. R. M. Burton,
Consolidated Coal Co.,
Connellsville, Pa.

Dear Sir:

In compliance with your request of January 3 and in confirmation of my verbal report of January 6, I submit herewith a report of my investigation of the condition of Gallery No. 30, on the fifty-foot level of Mine No. 19, which caught fire November 18, 1920.

Object: To determine the advisability of removing stoppings.

Recommendation: From the data obtained and the methods used in fighting the fire in question, I do not consider it safe to remove the stoppings for at least two weeks.

Discussion: Reference to my report of November 23 will show that the mine was not sealed until three days after the fire had started, and consequently it gained great headway. Analysis of the gases back of the stopping at the east end of the gallery, November 25, gave the following results:

Oxygen	15.1%
Carbon dioxide	3.7%
Carbon monoxide	0.4%
Methane	5.3%

Such an atmosphere would probably support combustion.

By December 5 the composition had changed to:

Oxygen	0.5%
Carbon dioxide	4.5%
Carbon monoxide	1.1%
Methane	6.0%

As this atmosphere could not possibly support combustion the fire was known to have been extinguished, but the heat was still considerable.

On January 2 the temperature was low enough to warrant removal of the stoppings without danger in another week, but on January 3 a mine car broke loose

on the grade in the gallery and, striking the stopping, dislodged it slightly, causing a leak of alarming size. After the stopping had been repaired, analysis of the atmosphere behind it revealed an oxygen content of 30%. As the temperature was not normal, this quantity of oxygen might cause the fire to break out again. The stopping was some distance from the fire area and consequently the oxygen present could reach the fire only by diffusion, which would probably require about one week. For the same reason, a week would be required for the effects of the combustion to be detected in case the fire should break out afresh. If at that time analysis shows that combustion is not taking place, the stoppings may be removed.

Respectfully submitted,
(Signed) R. A. CORDREY.

EXERCISES FOR CHAPTER XIII

1. Secure a commercial report, and criticize it as to its organization.
2. Write a report on the studies required in your course.
3. Write a report on the equipment in one of the school laboratories.
4. Write a report on the heating system of the school.
5. Write a report on the lighting system of the school.
6. Write a report on the discipline system of the school.
7. Write a report on the honor system.
8. Write a report on the fire protection of your school.
9. Write a report on the traffic system at a busy corner.

BOOK SUGGESTED FOR CONSULTATION

H. A. Watt: *The Composition of Technical Papers.*

CHAPTER XIV

SPECIFICATIONS AND CONTRACTS

Definitions. A distinction must be made on the one hand between specifications and contracts taken together, and reports, and on the other hand between specifications and contracts. The former is the easier, and for our purpose, the more important. Simply remarking that specifications are usually a part of contracts, and including both under the one heading, we may point out two main differences between specifications and reports. One difference is that reports have to do with work already accomplished, but specifications have to do with work yet to be done. A report tells how a given task has been carried out, a specification tells how a task is to be carried out. The second difference is in the legal standing of the two documents. A report does not have inherently any legal significance; of course, a report may come to have legal importance owing to some incident, like a trespass of other people's rights, or a misuse of materials or property, but there is no in-

tended legal bearing in the preparation of a report. A specification, however, does have legal standing as soon as it is accepted as the set of directions by which a certain piece of work is to be performed. This point is brought out by the further statement that specifications are incorporated into the contracts signed by the person or group of persons that authorizes the work, and the person or company that undertakes to execute the task. Now let us turn to the other distinction referred to — that between specifications and contracts. The definition of specifications in *Webster's Dictionary* reads as follows: "A written or printed description of work to be done, forming part of the contract and describing qualities of material and mode of construction, and also giving dimensions and other information not shown in the drawings." The essential factor is the exact and complete description of the materials and methods to be adopted in any required task. Under "Contract" the dictionary quotes the famous law writer, Blackstone: "An agreement upon sufficient consideration to do or not to do a particular thing." Here the legality of the acceptance of a commission is at stake, the details from a technical standpoint being, of course, included, but from the legal rather then the technical angle. As stated, a contract includes the specifications, sometimes as an inherent part, sometimes as an appendix.

Users of Specifications. The number of people that will be called upon to write specifications is not so large as the number that will write reports. Specifications are a more limited type of exposition. They do come very definitely into the practice of architects, real-estate men, building contractors, manufacturers, engineers, and inventors. These groups of men frequently stand between the capitalist who wants certain work done and has provided the money for it, and the workmen who do the actual manual toil necessary. The ideas of the promoters are transferred to the printed specifications, and from the paper are transformed by workmen into bricks, stone, concrete, steel, or whatever substance is to be used. The ideas of a nontechnical person are not always feasible in practice; the knowledge of the engineer, using the word in a broad sense, reduces them to a usable form. For example, an architect frequently has to alter the notions of an inexperienced house-builder when he draws the plans. This form will be such that the workmen will know just how to proceed with their work. The whole theory and practice of construction will be involved. The writer of specifications must, then, have a mind capable of looking both ways—to the more or less tangible ideas of the promoter, and to the narrower grasp of the manual worker.

Qualities of Specifications. From the point of view of the composition of specifications, there are three essential characteristics: accuracy, clearness, and completeness. Accuracy in this connection means the right word, the correct punctuation, the exact statement. Nothing must be left to the inference of the workmen—all they know is what is on the paper; they have not talked with the promoter, or caught his vision. They follow directions in a slavish way. The thing that these workmen must do, then, is the thing that must be put down in black and white on the paper. Great pains must be taken to have the directions absolutely accurate. Clearness means here a laying out of the work in the order in which it is to be done, and with sufficient detail to insure the completion of the work as desired. The task, as a whole, must be supported by the details in sequence. A knowledge of the mechanical principles involved is obviously essential to the writer, so that the workmen may begin at the right place, and fit each day's work into that of the preceding day. The clearness of the directions will insure the completeness of the task. Completeness means, then, that all the details necessary are to be included. It further means, from the point of view of English, the grammatical fullness of sentence structure that will not omit any words, or allow hazy reference of personal pronouns or relatives. The repetition of

nouns, even at the expense of smoothness and euphony, is better than any uncertainty of meaning resulting from shortened forms of expression.

Contracts. The subject matter of contracts involves the legal phases of the task more than it does the engineering principles. The two cannot be separated, however, because the legality will turn upon the interpretation of some engineering principle, fully as much as upon financial or legal considerations. What has been said under the characteristics of specifications will apply here, inasmuch as specifications are, as stated, a part of the contract. The terms of the contract have to do with the following matters: an exact description of the persons agreeing to the contract, the period of time for the whole and for any significant parts of the task, the financial obligations of each side, penalties, alterations, cancellations, extra compensations, settlement of disagreements, signatures, dating, legal execution of the agreement, etc. The services of a lawyer are almost essential in the drawing up of this type of a document. If the specifications are inserted before the signatures, then the engineer in charge of the work will be obliged to certify to the correctness of the details there given. If the specifications are a supplementary part of the contract, so put in order to have the contract itself as brief as possible, then

the two parts may be drawn independently and combined when the legal formalities are carried out. The inclusion of blue prints or other drawings should be arranged for carefully, also. Often the drawings are as important to the workmen as the printed directions. Frequently both are necessary, the one to explain the other.

The Form. A contract opens with a preamble stating the conditions of the task and the nature of it, in a broad way. The state laws fix the form of the agreement itself, but the form of the construction portions of the specifications must be left to the best judgment of the engineer who frames them. The form will properly include section headings, with a systematic grouping of points, arranged in the order of their use by the workmen. The order of the headings is not specified, as in the case of reports, because the nature of the work is varied, each problem requiring its own appropriate order. The standard of the English is invariable, whatever the choice of headings, although the legal phraseology is sometimes confusing at first. Cities prescribe the form of contracts, issuing pamphlets containing the form and all the definitions or terms that the city holds essential with any bidding firm. The following is taken from such a pamphlet printed by the city of Cleveland, Ohio:

CITY OF CLEVELAND
DEPARTMENT OF PUBLIC SERVICE
ENGINEERING DIVISION
CONTRACT AND FOR SPECIFICATIONS

.....

Then, on a page by itself is the form of the ADVERTISEMENT for the bids; this is followed, on a separate page, by INSTRUCTIONS TO BIDDERS. A blank page, is then headed: APPROXIMATE QUANTITIES. The actual contract is next given under the title: CONTRACT AND SPECIFICATIONS. This reads as follows:

This agreement made this .... day of .... A. D. 19.., by and between the City of Cleveland, by its Director of Public Service, in that behalf, duly authorized by ordinance (resolution) No..... of the Council of said City authorizing and directing the expenditure passed (adopted) ....19.., party of the first part, and ..... Contractor, party of the second part: WITNESSETH: That the said second party has agreed, and by these presents does agree with the said party of the first part, for the consideration hereinafter mentioned and contained, and under the penalty expressed in a bond bearing even date with these presents, and hereunto annexed, at his (their) own risk, cost, and expense to do all work, furnish all materials, labor, tools, appliances, ways and means, and construct and complete in an expeditious, substantial and workmanlike manner, and to the satisfaction and acceptance of the Chief Engineer of the Engineering Division of the Department of Public Service .... in the manner and under the conditions and requirements hereinafter specified, and in accordance with the plans therefor, on file in the office of the Chief Engineer, and in accordance with such supplementary plans and instructions as may be furnished from time to time by said Engineer during the progress of the work.

Following a blank page, headed, DESCRIPTION OF THE WORK, there appear the specific requirements of the city under these headings: GENERAL CONDITIONS, covering such points as, Supervision, Changes, Extra Work, Risks, Damages, Claims, Forfeiture, Obstruction to Traffic, and Cleaning Up; MATERIAL AND WORKMANSHIP, covering Foundation Excavation, Grading, Pavements, etc.; PILE FOUNDATION; CONCRETE MASONRY, giving Proportions and Tests for various kinds of work. Then come PRICES OF CONTRACT, BONDS, and SURETIES.

A sample contract for the Construction of a Sewer shows the same arrangement, except that the headings vary in wording to apply to sewer building rather than to general structure.

The impressive points of such a pamphlet are the legal nature of the contract proper and the minuteness of the items included in the specifications.

EXERCISES FOR CHAPTER XIV

1. Clip from a newspaper an advertisement for bids for some construction work; criticize the English.
2. Separate the descriptive from the expository material in a newspaper advertisement for a bid.
3. Discuss the characteristics of legal phraseology.
4. Answer an advertisement for a bid for construction work.

BOOKS SUGGESTED FOR CONSULTATION

D. W. Mead: *Specifications and Contracts.*
J. I. Tucker: *Contracts in Engineering.*

CHAPTER XV

ACCESSORIES OF EXPOSITION

Definition. Technical writing is seldom unbroken; almost without exception it makes use of helps in the form of tables of statistics, drawings, charts, or other material to supplement the written exposition. These helps may be called the accessories of exposition. There is a theory underlying their use and there are several methods of incorporating them into the text. Some of the accessories are familiar to us in other writing than technical matter, as will be noted as we discuss them. For convenience we will group them under four main heads: Statistics, Cuts, Charts, and Statements.

Statistics. The science of statistics is of modern origin; it has found an increasing usefulness, until now there are not only statistical bureaus, but also many statisticians with individual enterprises. The importance of statistics was brought out by President Garfield forty years ago in these words:

> The developments of statistics are causing history to be rewritten. Till recently the historian studied nations in the aggregate, and gave us only the story of princes, dynasties,

sieges and battles. Of the people themselves—the great social body, with life, growth, forces, elements and laws of its own—he told us nothing. Now statistical inquiry leads him into hovels, homes, workshops, mines, fields, prisons, hospitals, and all other places where human nature displays its weakness and its strength. In these explorations he discovers the seeds of national growth and decay, and thus becomes the prophet of his generation.

We may take the following as a definition of statistics: a collection of figures or data to show the condition or state of being of anything. *Webster's Dictionary* calls them "classified facts"; a student's definition says they are "the numerical statement of facts placed in relation to each other." The purpose is, of course, to bring together figures that represent the work or the experience of many people and make them easily comparable or usable for drawing inferences. No one person can investigate a phenomenon wherever it exists, but a great many different persons can secure data for study and send them to a common clearing house. The value of statistics can be separated into three phases, all interrelated: (1) Statistics are a convenient expression of facts as they already exist. This is the historical value, or the value of a record of information for reference or for convenience, in compact arrangement. (2) Statistics are an indication of correlation. This is the analytical value for the sake of interpreting present conditions. The concomitant variation of interdependent fac-

tors can often be shown admirably by means of statistics. (3) Statistics are a basis for prediction. This value suggests the importance of the past in foretelling future conditions. Fundamentally, the use of statistics depends upon certain mathematical laws, into which we need not go here. There are, however, some considerations of common sense or good judgment that must be observed if statistics are to be dependable. A few of the more obvious cautions are:

1. The unit of statistics must be clearly stated and explained. The importance of this is seen in financial figures when several countries are included; are the figures in American dollars, English pounds, or French francs, etc.? are they in pounds, bushels, or tons? Similarly in the census just how are the members of the occupations distinguished? What puts a person into a given class —*e. g.*, farmers, bankers, students? The unit of the statistics must be defined first.

2. The standards of the different items must be entirely comparable. The necessity for this caution is illustrated by figures for illiteracy, child labor, marriage, etc., for which the laws are different in the different states. In the case of child labor, for instance, one must know the legal minimum ages for employment before the figures for two states can be compared or contrasted. In the case of financial statistics, the relative value of the

money standards in the two countries must be taken into consideration, as the rates of exchange affect values of two units.

3. A reasonable length of time must be included in statistics that involve time. One must not draw important inferences from statistics that cover only one or two years, in such subjects as immigration, social conditions, exports or imports, business failures, etc. The years chosen may have some peculiar circumstances, whether unknown or not, that will have a bearing on the value of the statistics—*e. g.*, war conditions, presidential election, etc.

4. The items chosen must be typical of the whole to which they belong. An illustration would be figures for the labor turnover. If only one industry is taken, say the garment industry, one would not be warranted in generalizing about all industries, or if only department stores were cited, one could not make a statement about mills and factories.

Turning now to the various forms in which statistics may be presented, we find four rather common ones, each one bringing out certain excellent ideas.

1. *Averages.* In its mathematical use an average is obtained by equalizing several varying amounts. It gives a picture or a concept of a large group or class by means of a single item taken

as sharing the qualities of the whole. Averages are divided into three types: arithmetical, weighted, and geometric. The last is used only in pure mathematics, where it involves the multiplication of n items of a series and the extraction of the nth root, and need not concern us here. The arithmetical average is the simplest, requiring the addition of the items and the division of the total by the number of items. The weighted average gives to certain important items of a group an arbitrary value indicating their relative importance, and multiplies these items by the coefficient assigned before the sum is taken. Then the sum is divided by the sum of these coefficients or weights (all items not judged especially important are considered as multiplied by unity and constitute the standard) instead of by the mere number of items. An illustration will make the matter clear. A college football team is composed of eleven men with varying weights. The arithmetical average of the weight of the men on the team could be found easily by adding the individual weights and dividing by eleven. This, however, would not give a very exact basis for predicting the strength of the team in a certain game, or for comparing it with another team. A fairer basis would be to give rather arbitrarily a factor indicating the strategic value of certain positions on the team; for instance, three to center and each of the guards,

two to each of the tackles and the half-backs, and one to each of the other four positions. The weight of the men in these important positions must be multiplied by the factors indicated, and the total weights of the eleven men obtained then must be divided by twenty-one, instead of by eleven. If the heavy men on the team should be at the ends or at quarter-back or at full-back, the playing strength of the team would be less than if they were at the positions indicated by the larger factors. It is admitted that there is a personal element in the assigning of the factors; one man's judgment might differ from another man's as to the relative significance of certain items.

2. *The Mode.* If the purpose of the exposition is to show the facts of greater frequency, or of greatest density, the form of the statistics used is called the mode. The word as used in other connections suggests the prevailing fashion or method; the same idea is conveyed in its mathematical use. The mode is the figure that indicates the item occurring most frequently, and therefore the most typical of the group. The mode will give a correct idea of the whole. For instance, if a student's theme papers, twenty in number, are graded: 2 A's, 2 B+'s, 3 B's, 8 B−'s, 2 C+'s, 2 C's, and 1 C−, the grade that occurs with the greatest frequency, *viz.*, B−, is representative of the stu-

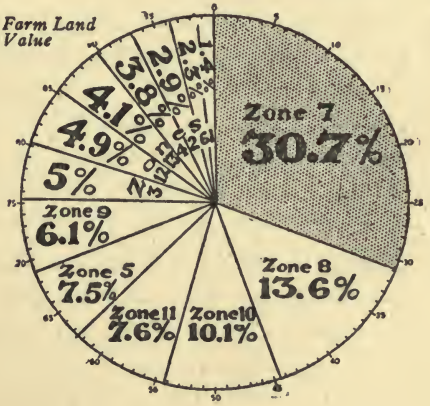
dent's ability in theme writing. It is his mode. Little or no calculation is required to find it.

3. *The Median.* If there is a fairly small group of items, the representative one or typical one can be found by arranging the items in order of size, or value, and counting to the middle one. Such an item will be so far from the extremes at either end that it will be a fairly correct standard for the group. It is called the median. An illustration would be to find the average height of a roomful of people; if the company is arranged in order of height and counted off until the person in the middle of the line is reached, we will find its average in the height of that person. Both the mode and the median are, of course, approximate rather than exact standards; however, they yield surprisingly accurate results.

4. *Tables.* A table, in its statistical meaning, is an arrangement of comparable figures in columns or rows, or both, in order to show the elements of comparison clearly. No particular number of figures is necessary before one is warranted in calling such a scheme a table; no standard arrangement is required other than the one named. A table has a heading or an explanatory statement giving the unit involved or other information necessary to an understanding of it. A table has advantages of compactness, of convenience, and of ease of comparison.

Cuts. The second form of the accessories of exposition is called cuts, a name that includes diagrams and illustrations. The word *cut* denotes an impression left by a plate or engraved block,

Note that The Chicago Territory—Zone 7—has only 8.7% of the area of the country, but its farm land is worth almost half as much as that of all the rest of the United States combined. The Chicago market rests on the most secure foundation the human mind can conceive—the fertile prairies of the great American corn belt. These farms create billions of dollars of new wealth each year. And this year's crop will break all records.

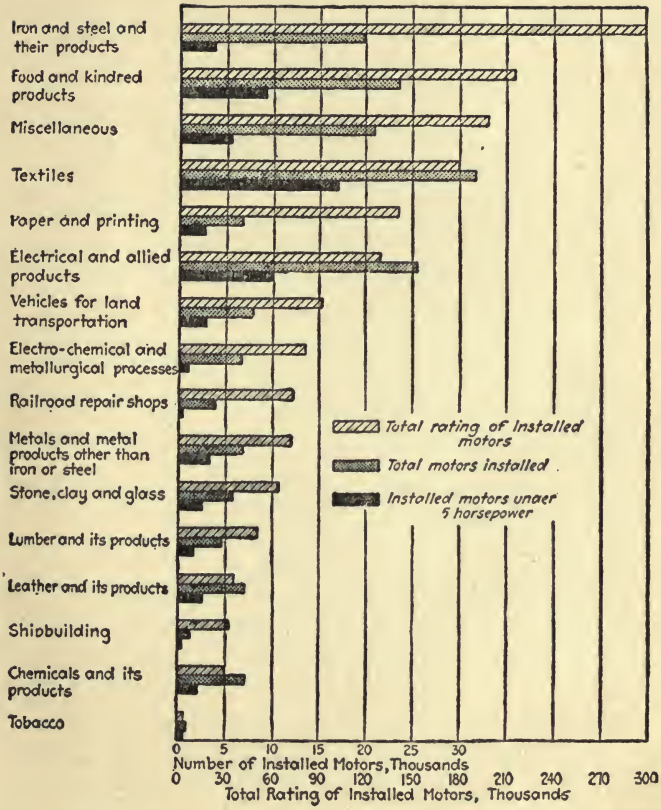


A PICTOGRAM

and is, therefore, a general term. There is, however, a difference between diagrams and illustrations. A diagram applies to line drawings, usually showing construction or at least arrangement of parts. An illustration is the reproduction of a

photograph, or of a sketch, showing external appearance. The word *Figure* is usually used in a text to apply to either, and figures are numbered serially without distinction as to whether they are diagrams or illustrations. The clear placing of textual reference and the cut is desirable.

Charts. The third form of the accessories of exposition is charts, a term which includes graphs, pictograms, and cartograms. A *graph*, or a frequency curve, as it is sometimes called, is a curve, or a series of curves, related to co-ordinated axes. There are two factors, which acting together produce or determine a resultant. The two factors are respectively the ordinate and the abscissa, and the resultant is the curve produced by plotting and drawing the locations of the intersections at frequent successive stages. Very commonly one of the component elements is the time factor. An example is the curve showing the imports and exports, either separately or together, covering a period of years. A *pictogram* is a series of pictures, or bars, or sectors of circles, or facsimile designs, drawn to a scale, and showing the relative size or importance of the items treated. The reader can draw his own conclusions if the presentation be accurate. An example of the pictogram is seen in the heavy black bars denoting the size of elements of our population, or the size of the votes in an election, by states or by parties. A *cartogram*



IRON AND STEEL INDUSTRY LEADS IN TOTAL RATING OF INSTALLED MOTORS

A PICTOGRAM

is a map (the word revealing the original of "chart"), which is colored, or shaded, or otherwise marked to show distribution. The maps issued by the Geological Survey are good examples, showing the basic elements of a region, or the distribution of ores; another common example is the daily weather map issued by the United States Weather Bureau. Examples of a pictogram and a cartogram are shown here.

Statements. The fourth form of the accessories of exposition is statements, by which we mean those helps that cannot be classed as statistics and are not pictures or maps. They are condensed information or subordinate material in literary form. Under this heading we include: formulas, equations, footnotes, and appendices. A *formula* is a concise rule or principle used in reaching desired conclusions. The use of formulas is very common in chemistry, physics, mechanics, electricity, and mathematics. The approved form of printing them is to give each one a separate line; this is done for the sake of clearness as well as for convenience. The plural of the word is either the English or the Latin spelling; the tendency to use the English, "formulas," is to be encouraged. An *equation* is much like a formula, except that it always involves the equality of two factors or sets of factors. The sign of equality is used to denote this. The reactions in chemistry are spoken of as equa-

A CARTOGRAM

THE RELATIVE INDUSTRIAL IMPORTANCE OF THE VARIOUS COUNTIES OF THE STATE OF NEW YORK

tions; the term is also used in astronomy and, of course, in algebra and other branches of mathematics. The important point to be noted in the printing of equations is to keep the whole equation together on one line if possible, and if not possible, then to break it at the sign of equality. Mathematical expressions that include the radical or parentheses must be carefully written if they occur in equations. Often the significance of an equation depends upon the near position of other equations; a kind of tabulated arrangement is then desirable. A *footnote* is an item at the bottom of a page adding some information to a statement in the text, identified by means of a common symbol. There are two kinds of footnotes: (1) an explanation of some point in the text that is supplementary rather than vital, perhaps filling out some detail or giving some parallel thought; and (2) a citation of reference or authority for some information, such as a name, a publication, with volume (if necessary), and page to be consulted for further verification. In the case of a periodical the name of the magazine is given, the volume, year, page, author's name, and the title of the article. In general, the footnotes give all data essential for a reader to find exactly the place where the original of the quotation or assertion is to be found. A regular order or form of footnote should be followed consistently in any one book or article, both

for quick and easy understanding by the reader, and for the saving of time and labor for the writer. For a book reference such as would be used in giving the source of a translation or a quotation, the following form is recommended:

C. H. Woolbert, *The Fundamentals of Speech* (Harper, 1920), p. 385.

For a magazine or newspaper reference, the following is proper:

Color and Color Photography. C. D. Hodgman. *Sci. Am. Supp.* 84:339-400. Dec. 22, 1917.

Sometimes the word *See* or the Latin abbreviation *cf.* is used in front of such a reference. It has been stated that the position is at the bottom of the page upon which the citation occurs; it will be well to distinguish between the two types of footnotes in this matter. A growing practice is to have a different system of symbols for the two kinds, say small superior letters, or printer's signs like the asterisk, dagger, and symbol for section, for footnotes of explanation, and a series of elevated numbers for footnotes of reference; and further, to place only the first kind at the foot of the page, where they can be read at a glance in connection with the context, and to gather the notes of reference at end of each chapter, or still more preferably, at the end of the last chapter. The advantage is

that citations will seldom be looked up at once, and therefore need not take up either the room on the page or the time for investigation, and when placed together will serve as a kind of bibliography for the special reader. Some duplication of titles may also be saved by the use of ditto marks. The frequent use of the Latin abbreviation *ibid.* or word *idem* is objectionable on the pages of a text, requiring, as they frequently do, the turning back of several pages.

Appendices. An appendix is a separate exhibit of details, usually statistics, although sometimes documents in full, which are in the nature of evidence or proof of assertions made in the body of the writing. The presence of these statistics or documents is not essential to an understanding or an acceptance of the facts stated; they are, however, both helpful and interesting to a close student of the subject matter. In textbooks, illustrative material, sets of questions, exercises, extended quotations, etc., are put in appendices, each one in an appendix of a different number in serial order. An annual financial report furnishes a good example, in which the itemized statements of the separate departments or special funds are shown after they have been given in summary in the main section. In this instance the itemized statements are frequently called exhibits. A textbook in American history will give the full text of the

Constitution of the United States or of the Declaration of Independence in an appendix, rather than take the pages necessary at the place where mention is made of their adoption.

Other Helps in Books. Having discussed the four main types of accessories in exposition, we may examine briefly certain other helps in the preparation of books or longer articles and reports —helps that are found in other types of writing than exposition, but equally helpful here. First, there is a *Glossary*. Sometimes a book discusses a subject that is difficult because it is highly specialized, or is devoted to a period of time or a geographical place whose terms are partially unfamiliar. The text of such a book will be very likely to have strange words in it. Either because they have been outgrown by common usage or because they have a very limited application, such words will need very careful explanation in order that the text as a whole may be intelligible. The book will, therefore, have a list of all such words, usually at the end, together with their meanings as understood by the contemporaries of the time or place, or by the specialists in the subject matter of the book. So far as the unfamiliar words used in that book are concerned this list, called a glossary, constitutes a concise dictionary included within the covers of the book itself.

Second, there is the *Index*. An index is an

alphabetical arrangement of the subjects discussed in the body of the book, with page numbers included. In almost all non fiction books the index is an important addition. It follows the text and all appendices; it must be prepared after the page proof is available. Sometimes proper names are separated from subject words, making two indices. A greater difficulty is to select clear and reasonable words for the index entries. Frequently silly and irrelevant words are found, which no one looking for a particular topic would think of using. The index must really indicate the contents of the body of the book, in quantity to be convenient, and of quality to be helpful.

Third, there is the *Table of Contents*. The chief difference between an index and a table of contents is that the former is an alphabetical arrangement of the topics treated, and the latter shows the order of topics adopted by the author of the book. The former, also, is placed at the end of the volume and the latter at the beginning. Usually the table of contents consists of the chapter headings only, sometimes of subdivisions of chapters. When it does give subdivisions of chapters it really constitutes an outline of the contents of the book and is a good illustration of that process of analysis. Its convenience in all textbooks is obvious.

Fourth, there is the *Preface*. A preface is a personal introductory statement by the author or

editor of a book, setting forth the reasons that prompted the preparation, or the experiences that justify the preparation of the book. It tells the purpose that the author himself conceives will be fulfilled by the book. It may further make any explanation of circumstances, including assistance and advice received, and make acknowledgment of such courtesies. It is the custom to include a preface in every textbook.

A person using books should know the function of libraries and their methods, among which are *Catalogs.* A catalog is a complete, systematically arranged guide to the contents of a collection of any objects. Catalogs of book collections that are growing are usually of the card-index type, one entry on a card, placed in strict alphabetical order. A somewhat different form of catalog is the commercial type in common use in business. Catalogs of the products of a factory or of articles on exhibition are usually issued in booklet form, arranged either alphabetically or departmentally or both. Prices and descriptions, including order numbers, are given. A catalog is intended to aid a person to find a desired article; it should not be so cumbersome or involved, therefore, that it defeats that aim.

Bibliographies. A bibliography is a catalog of a special and limited kind, in that it gives a list of books or other printed sources, consulted for

a certain piece of work, or available on the subject matter of some special field. Bibliographies are desirable in all technical monographs or reports that involve much reading in their preparation, for they reveal the range of the investigation. A writer should carefully preserve the exact titles and other essential information of all the works he consults. The arrangement in the final publication is usually alphabetical by authors. The location in the book is most commonly after the conclusion of the text, before any appendix, and before the index. It may be made Appendix I if there is a series of appendices. In reports and in some other publications, the bibliography often precedes the statement of the object of the report or the beginning of the text.

The Use of a Library. A person that is called upon to write should understand the method used in arranging and in cataloging books. In fact, the use of a card catalog, the chief points in the system of classifying books, and the methods of the organization of reference works, are a part of the educated man's equipment. Libraries have a dictionary card catalog—*i. e.*, one that alphabetizes together the author and the subject cards. The difference in spacing the names of the author, and the title of the book, in relation to the vertical ruled lines on the card, indicates whether a card shows a book by somebody or about somebody.

The system of book classification numbers which most libraries use is known as the Dewey Decimal System, or some modification of it to suit special needs. The main divisions, and the subdivisions of its Useful Arts section, in this system are as follows:

000 General Reference Works.
100 Philosophy.
200 Religion.
300 Sociology.
400 Language Study.
500 Natural Science.
600 Useful Arts.
700 Fine Arts.
800 Literature.
900 History.

600 General Works, Useful Arts.
610 Medicine.
620 Engineering.
630 Agriculture.
640 Domestic Economy.
650 Communication and Commerce.
660 Chemical Technology.
670 Manufactures.
680 Mechanic Trades.
690 Building.

Each one of the subdivisions is in turn divided, with a logical numbering plan, until at last the individual book is reached.

Reference Works. A writer should know the available reference works in his field of study. Each department has its special works. First there are the general encyclopedias and dictionaries, not only in English but in other languages as well. There are many indices to books and periodicals, some of them general, like *The Reader's Guide*, and some of them limited, like *The Industrial Arts Index*. Many libraries and many large industrial

companies issue bibliographies of works in their own department. An amazing thing, to a student in research work, is the extent of the articles and books already issued upon almost every conceivable subject, or at least the origins of that subject. Not to know them all, but to know where to go when one wishes to find them is a factor in efficiency, whether one's work is for his own satisfaction or for the advancement of human knowledge about a given subject. To write upon any topic demands that one gather about him a great amount of material, that by good judgment he sift the useful from the unimportant in the light of his primary purpose, and that he express his own thought clearly and effectively. A knowledge of the sources of material and of the use of these sources is therefore essential to anyone preparing a written discussion, especially so to the student.

EXERCISES FOR CHAPTER XV

1. Clip from an advertisement in a magazine an example of a graph, and comment on its construction.
2. Find in some magazine an example of a pictogram; of a cartogram; of a table of statistics.
3. Reconstruct a table of statistics in different form.
4. Transfer the information in a table to the form of a graph.
5. Write out an illustration of the weighted average.
6. Bring in examples of each kind of footnotes.
7. Find a book with appendices and describe them.
8. Name the reference books on biography that are available to you.

9. Report on the system of cataloging used in your school library.
10. Examine a copy of the U. S. Census Bureau report and describe its organization.

BOOKS SUGGESTED FOR CONSULTATION

R. W. Sellars: *The Essentials of Logic.*
W. C. Brinton: *Graphic Methods for Presenting Facts.*
U. S. Census Report.

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THE END